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MAN—POSSESSOR OF THE MOST MARVELOUS MACHINE IN THE WORLD.

But He Cuts the Price.

When Dr. Lardner wrote his "Animal Physics," 50 years ago, he said that the human mechanism was the most marvelous in the world. When he said that, medical scientists at that time stood on the threshold of the present knowledge of the human system. The circulation of the blood had been acknowledged but a comparatively short time before. Men's understanding of the marvels of the human structure was still limited. Fifty years have demonstrated the truth of Dr. Lardner's statement, yet men today are satisfied to work their machines at 25 per cent of their earning capacities or to rent them out in bare exchange for food, clothing and housing.

In other words, they cut the price.

Each of us possesses a wonderful machine made up of some 200 bones and 500 muscles—flexors and extensors—each of them acting as an individual spring. A marvelous machine, indeed! It provides its own fuel; it lubricates itself; it acts as its own janitor, scavenger and sewage-disposer; it gets rid of its own waste products; it cremates its own impurities in the combination of oxygen of the air and the carbon of the blood; it creates its own heat to maintain the working pressure through the system.

Do we think so cheaply of our property as to utilize it to do work at a loss? Are we compelled to cut the price?

The machine we own is the most perfect "automobile" known, generating and maintaining its own power; it takes its owner to the location of the work to be performed, whether it be to the height of Mt. Rainier or to the depths of the Mammoth Cave of Kentucky. In locating itself, it is assisted by a seeing organism—the eye—which grasps the necessary details of the performance, acts as a calculator to estimate dimensions and a recorder to visualize these at will and to assemble them for adjustment in proper proportions. The frame of the machine can assume a hundred different positions

for lifting, pushing, pulling, tilting, tipping, transporting the different weights of the loads involved.

Need we cut the price on this machine's work?

Man is provided with eyes that adjust themselves automatically to all conditions of nearness and distance, light and darkness. They contract or expand as required; they are the most important medium by means of which the man is kept in touch with the world which surrounds him and all he holds dear. Man's eye gages the job, perceives the dimensions and estimates the proportions.

Man owns it, but he cuts the price.

Study the hand. Its fingers will take a pinch of salt or twist a piece of wire. The thumb and finger of one hand will tie a knot. The fingers and palm can be used for a scoop. The fingers and thumb will pick up a piece of tissue paper from the floor or lift a barrel by the edges of its hoops. Buttoning and unbuttoning the clothing is a wonderful operation of the hand. By holding the cigar between thumb and forefinger you can flick off the ash with a delicate movement of the little finger. The hand has a thousand different actions. It can guide the pencil point to a complete circle. The third and fourth fingers will hold a needle while the thumb and first fingers push the thread through the eye and are then used to draw it entirely through.

Man will use the same hand to draw up the bid that cuts the price.

Man possesses a brain, the greatest storage-battery known. It stores up sensations of sound, light, heat and feeling and recalls them at will. It reproduces them singly or in groups and gives them ever new relationships. This brain has the most complete telegraph, telephone and wireless departments in existence, all of them self-maintaining.

Man uses this same brain to calculate the lowest cut in price.

Man has a mouth. Its tongue can reach and probe the space between the teeth and the lips. Teeth and tongue, mouth and throat, are used in combination to produce all manner of sounds, of high and low pitch, and to make spoken language which expresses every shade and depth of sentiment and passion of the human race.

Man uses this tongue and mouth to lie about quality and to persuade the acceptance of a low price.

Strange to say, the man, who can use his tongue to discriminate between bone and flesh in eating, to ferret out the most minute piece of fishbone and to eliminate the apple-pip and bring it to the teeth for rejection—this same man seems paralyzed in the effort to make effective discrimination between goods that are garanteed and ungaranteed and between prices that are profitable and unprofitable.

The greatest machine in the world is misused, its value is continually underestimated and the price is cut.

Woe to the man who runs his machine at half-capacity! Woe to the man who underestimates the value of his equipment! Neither of them has any right to complain about loss. Neither of them has taken the right way to insure a profit.

Man, as a whole, must be educated to use the machine he owns to the best advantage. We are a dollar-mad nation. By examples around us, we have become imbued with the distorted belief that the machine can operate to the best advantage and with less power by the exercise of grafting methods, and the practice of grafting enters into every department of human activity—mental, physical and commercial. We are producing a nation of flat-breasted women and narrow-minded men, both of them incapable of and unwilling for reproductiveness.

The trouble is—we cut the price.

No man of a civilized race believes today that slavery is permissible. Any attempts to auction off human beings at bargain prices would stir this country to its profoundest depths. So callous are we, however, so incapable of seeing and understanding analogies, that we survey with indifference the piteous spectacle of men selling themselves into life-servitude by cutting prices. Unwilling slavery was the misfortune of the slaves in past days; willing slavery is the disgrace of the present time.

We owe it to ourselves to examine closely the thousand and one valuations of our machine. We owe it to ourselves that we should take stock and give it a higher appraisement.

We must not cut the price.

"Follow the Leader."

A nervous commuter on his dark lonely way home from the railroad station heard footsteps behind him. He had an uncomfortable feeling that he was being followed. He increased his speed. The footsteps quickened accordingly. The footsteps still pursued him. In desperation he vaulted over a fence and rushing into a churchyard, threw himself panting on one of the graves.

"If he follows me here," he thought fearfully, "there can be no doubt as to his intentions."

The man behind was following. He could hear him scrambling over the fence. Visions of highwaymen, maniacs, garroters and the like flashed through his brain. Quivering with fear the nervous one arose and faced his pursuer.

"What do you want?" he demanded. "Wh—why are you following me?"

"Say," asked the stranger, mopping his brow, "do you always go home like this? I'm going up to Mr. Brown's and the man at the station told me to follow you, but is there much more of this to go through before we get there?"—The National Monthly.

Iodide Method of Demonstrating the Flow of Water Through Pipes*

By A. Sayers, Lecturer in Plumbing, Municipal Technical Institute, Belfast.

Few, except those who have had the experience of giving instruction on the subject of hot-water circulation and domestic hot-water supply, can fully appreciate how difficult it is to convey to the mind of students in a clear and concise manner many of the intricate principles involved; and none but the student can fully realize how hard it is to follow the instruction, and understand the manifold principles of a highly technical and scientific character which entwine themselves around the art which he hopes some day to be master of.

Those who have at their disposal the facilities offered in a properly equipped technical school are placed at a considerable advantage, and with the improved apparatus, which is to be found in most centers, instruction in the subject has been considerably simplified.

Many years ago, Mr. F. Dye recommended all students of heating to possess themselves of a model in glass of a hot-water apparatus, to experiment with and demonstrate principles which might aid them in their studies and help in the solution of difficulties which might arise in their daily calling.

Apparatus of various kinds have also been introduced in the different technical schools to demonstrate the flow of water through pipes and aid in imparting instruction. Thermometers inserted at different points indicate the rise and fall of temperature, and a series of observations made during the experiments enable the students to make certain deductions regarding what is happening inside the system, and in this way a great deal of information may be obtained, if the student will apply himself scientifically to the subject. But here, again, the absence of ocular demonstration is a serious drawback, and often much has to be taken for granted, especially by beginners.

That the mind is most easily reached by way of the eye holds good in most cases, and this especially is true in regard to circulation of water through pipes. It may aptly be said that a minute's showing is worth an hour's telling, but the difficulty of giving a practical significance to this saying has hitherto been much felt.

When working with glass apparatus some indicator must needs be employed in order to demonstrate any movement which takes place in the water. Sometimes suspended particles, such as amber filings, and sometimes a colored solution, such as permanganate of potassium, are employed; but none of these can be considered wholly satisfactory.

The introduction of a coloring solution that will change its color with the rise and fall of temperature has opened up possibilities that must have far-reaching results, and converts the glass model heating apparatus into a working model of a hot-water circulating plant. By the changing of color as the temperature rises and falls, the student is able to follow the various directions of the currents, both during the period of circulation and also draw off, as well as to observe the degree of stagnation that may be in any part of the water column, arteries, or branches.

For some time past, in the Building Trades' Department of the Municipal Technical Institute, Belfast, glass apparatus has been extensively used to show the various currents in hot-water circulation, a solution of iodide of starch, or what has come to be locally known as the "Still-Davidson" method, being employed as an indicator.

Outside chemistry it may not be generally known that if iodine be added to a solution of starch a deep blue color is produced. This color is destroyed if the temperature is raised to between 160 degs. and 180 degs. Fahr., at which temperature the liquid becomes colorless. On cooling, the solution again returns to its original blue; in other words, the blue color disappears when sufficient heat is applied, but reappears on cooling.

If a quantity of iodide of starch be added to the water in a glass hot-water apparatus a blue tint is imparted to the water. When heat is applied to the boiler and the

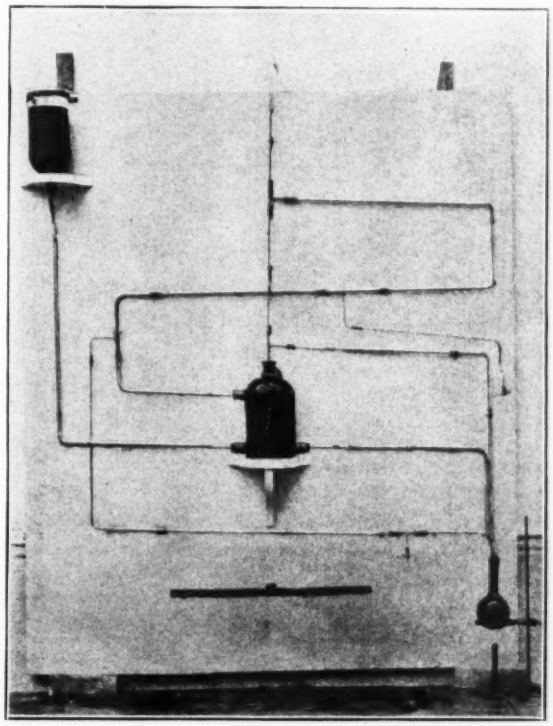


Fig. 1.

temperature of the water raised, the water becomes colorless, and may be watched in its progress along the flow-pipe into the cylinder and through the various other arteries connected with the system. If water be drawn off from a long branch-pipe the first water drawn off will be blue, and afterwards commence to flow colorless. When the tap is shut off, and the water allowed to be stagnant in the branch-pipe, the blue color returns on cooling, demonstrating to the class the need for secondary circulation.

Again, it is most instructive to watch the behavior of the return cold blue water as it enters a hot column in the boiler or cylinder; how it falls or gravitates to the bottom of the vessel—not mixing with the hot (colorless) lighter water, but finding its proper level according to the law of gravitation. The same principle is again ex-

*Reproduced by courtesy of "The Plumber and Decorator," London, England.

emphified when hot water from a flow-pipe enters a cold column; it ascends direct to the top in obedience to the same law.

The fact that it is possible to demonstrate by this means clear (hot) currents of water passing through dark (cold) columns, or dark (cold) currents passing through clear (hot) columns, not alone adds to the interest of the laboratories or lecture-room, but it simplifies very considerably a most intricate subject, and places an intimate knowledge of scientific principles within the reach of the most backward members of the craft.

If the reader will refer to Fig. 1, he will see a cylinder and secondary return-system. It will be noticed that a

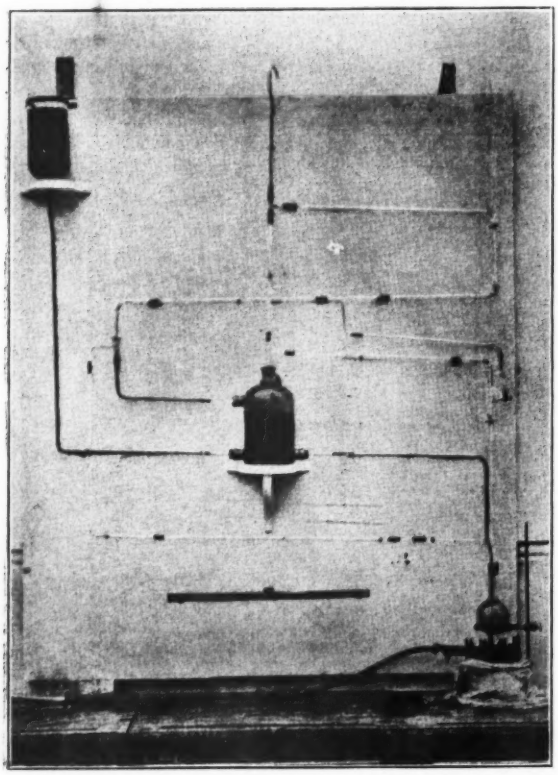


Fig. 2.

small pipe is taken from the secondary circulating-pipe and enters the boiler in the same way as the primary return-pipe; and although the illustration shows the secondary return-pipe entering the side of the cylinder near the top, this pipe, being shut off, was not acting during the experiment, the secondary circulation being by way of the small pipe into the boiler. Hence, we have before us a secondary circulating system, with the secondary return-pipe reduced in diameter and connected with the boiler.

The 2 ft. rule below the cylinder gives the scale approximately, and enables the reader to form an idea of the dimensions of the apparatus, which consists of glass bottles and flask connected by glass tubes and rubber connectors.

It is not, however, the province of this article to discuss this or any other particular system, but rather to deal with the iodide method of demonstrating the flow of water through pipes.

The apparatus was filled with water, to which had been added a solution of iodide of starch, made up as follows:

6 grams of starch.
0.64 grams of iodine.
5 grams of potassium iodide.
3 litres of water.

Make the starch into a thin paste with water, and add 500 c.c. of boiling water. Continue boiling until all the starch has been dissolved, and cool by adding cold water.

Dissolve 5 grams of potassium iodide in 30 c.c. of water, and dissolve the .64 grams of iodine in it. This quantity will be sufficient to color from 12 to 20 litres, depending on the intensity of color required.

Fig. 1 shows the apparatus before heat was applied, and it will be seen that all the pipes and fittings are the same color—dark.

Fig. 2, which was taken some time after heat was applied, shows the flow-pipes clear, and the return-pipes, cold supply, and branch pipes dark. On closely examining the cylinder it will be seen that the upper hot portion is clear, while the lower portion is dark; thus showing the contrast between the hot and cold water and the absence of any mixing in this fitting.

Fig. 3, taken when all the water had circulated once round the system, shows all the pipes and cylinder clear, except the layer at the bottom of the cylinder.

The dark, cold water, seen in Figs. 2 and 3 entering the boiler, is worthy of notice, as is also the stagnant dark water in the secondary return-pipe between the cylinder and the point where the reduced pipe joins. It will be seen that the water in the expansion-pipe above the secondary flow-pipe is also stagnant (dark).

The return-pipe terminates in the boiler about halfway down, but it will be noticed in Fig. 2 that the cold, dark return water continued in a direct current until the bottom of the boiler was reached, and then spread out in a sheet. On drawing off, the direction of the currents could be seen, and the various stages of mixing noted with interest.

The points mentioned are only a few of the many that might profitably be dwelt upon, but the present article is intended simply to place before the readers a few facts that may be of interest, and help other centers, as well as individual readers, to provide themselves with suitable apparatus and adopt similar methods of studying the intricacies of hot-water circulation.

It can readily be understood how very difficult it is to convey by photography the circulation of water through pipes, and it must be confessed that the present illustrations do not do justice to the apparatus. But the whole plant is so very inexpensive that readers and plumbing classes, who have not already supplied themselves with glass apparatus, would do well to do so without delay.

This method of demonstrating currents not only applies during the heating process but is still more instructive during the period of draw-off. For example, if the teacher of plumbing wishes to give a lesson to his students on the methods of connecting cold supply to a cylinder, let the apparatus be fitted up with the cold entering the cylinder pointing in an upward direction; and when the cylinder is heated and clear, draw off some water from a branch, and note the effect. Afterwards connect the cold to the cylinder, pointing in a downward direction; repeat the experiment, and note the different effect. In this way very many points at present only dimly understood may be clearly demonstrated and placed beyond the sphere of doubt.

In conclusion, the writer would like to point out that in working with model apparatus care must be taken

to guard against erroneous results, and allowance must always be made for the miniature fittings, remembering that heat, friction, capillarity, etc., are factors to be considered.

With these few introductory remarks the iodide method may be commended to all interested in the subject of the flow of water through pipes, and the writer hopes that

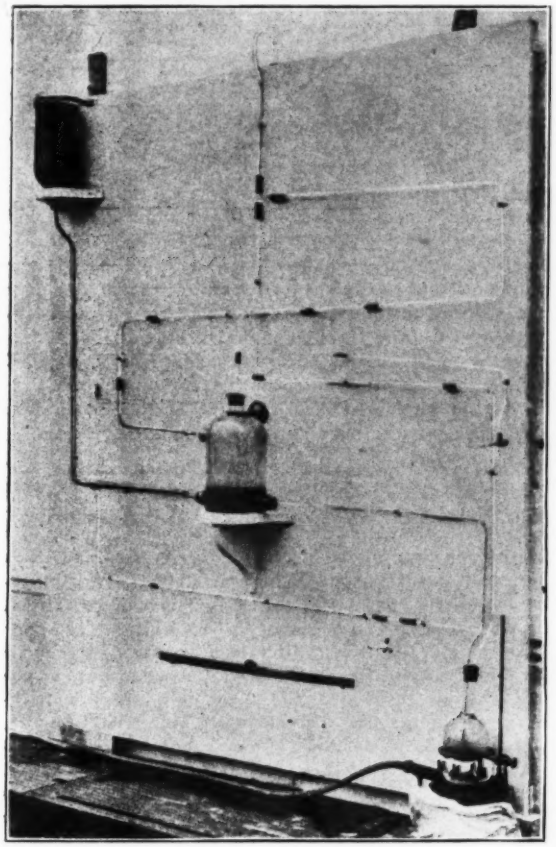


Fig. 3.

the study of this branch of the trade may be simplified and that teachers of plumbing may find a ready method of demonstrating their lectures.

It may be mentioned here that the apparatus was devised by Mr. W. Davidson, Chief Manual Instructor at the Municipal Technical Institute, Belfast, while the idea of using a starch and iodine experiment was suggested by Mr. C. J. Still, Assistant Lecturer in Chemistry at the same institute.

MAINE MASTER PLUMBERS MEET.

An adjourned meeting of the Maine Master Plumbers' Association was held on Labor Day at Bangor, Me., the session being adjourned from the annual meeting held at Auburn recently. The meeting was held in the Chamber of Commerce room at the city building, president E. W. Goss, of Lewiston, presiding. Addresses were made by A. Selden Walker, East Orange, N. J., president of the National Association of Master Plumbers, on the benefits to be derived from organization; by treasurer J. H. Chase, of Lewiston, Me., on the benefits of enforcing board-of-health rules, and by James K. Chamberlain, of Bangor, Me., on overhead charges. There was a general discussion of securing favorable legislation in the state legislature this fall. The Maine members attending were: C. L. Wright, Belfast; N. J. Prescott, Sanford; J. E. Donovan, Winthrop; George E. Reed, Gardiner; John Tardy, Waterville; J. F. Kelley, Gardiner; Albion P. Goodhue, Stockton Springs; E. Fradet, Lewiston; vice-president, R. H. Dowing, Bangor; secretary G. L. Leonard, Waterville; treasurer J. H. Chase, Lewiston; Eldrith Arnold, Auburn; C. F. Dolliver, Lewiston; George W. Toppan, Fairfield; E. W. Goss, Lewiston; R. H. Downing, Bangor; John B. Smith, Lewiston; G. L. Leonard, Waterville; J. K. Chamberlain, Bangor; E. F. Kelley, Bangor; and E. F. Hayden, New York.

GALVESTON, TEX., HAS NEW PLUMBING ORDINANCE.

The city council at Galveston, Tex., has just passed a new plumbing ordinance which contains a number of provisions, and it is expected that some of the burdens of the commissioner of waterworks will be lifted under the new plumbing law.

INTERMOUNTAIN EXECUTIVE COMMITTEE MEETS IN DENVER.

The executive committee of the Intermountain States Master Plumbers' Association recently held a meeting in Denver, Col., to consider and pass upon several matters pertaining to the association which required attention. Those in attendance were Chris Irving, Denver, Col.; Henry Green and Chas. J. Higson, Salt Lake City, Utah; N. W. Haas, Colorado Springs, Col.; Edw. F. O'Connor and Peter E. Snow, Denver, Colo.; Dennis E. Burke, Pueblo, Col.; Jett E. Nash, Cheyenne, Wyo.; Moses Stone, Jr., Greeley, Col.; Frank Burnzen, Boulder, Col.; and E. L. Moore, Longmont, Col.

D. C. PLUMBING-INSPECTION REPORT.

The annual report of the Inspector of Plumbing for the District of Columbia has been made by Alfred R. McGonegal to the Commissioners, showing the work of his department for the fiscal year ending June 30, 1910, with recommendations looking toward the improving of the service both in his department and in several other branches with which his office comes in contact.

It is shown that the work of the office has increased about 35 per cent over the previous year both in the field and clerical ends. A table of inspections made by the outside force shows a total of 44,953, over 39,404 of the year before, of inspections made on all work by the force of nine men.

Mr. McGonegal has again recommended the establishment of public-bath buildings, as well as swimming pools in the schools, where the children could be taught the art of swimming as a part of the school course. Public-convenience stations come in for a good word and arguments for more of these structures in the National Capital.

IN THE INTEREST OF THE PENNSYLVANIA MASTER PLUMBERS' ASSOCIATION.

S. S. White, president of the Pennsylvania Master Plumbers' Association and also president of the Pittsburgh association, plans a trip through the state at an early date with a view of building up the membership of the state organization. "I plan to go around to have a little heart-to-heart talk with the members and non-members of the State association," said Mr White to "Domestic Engineering," "and I believe the trip will be productive of good results. Just how soon I will start depends entirely upon the time I will be able to give to the work. The State association is growing, but, like everything else, there is still room for expansion." Members of the Pittsburg association laud Mr. White for the work he has done in building up the local organization. He is a member of the firm of Carson & White, 1827 Perrysville Ave., Northside, Philadelphia, and he is one of the busiest fellows one would meet in a day's travel. The next meeting of the State association will be held in Johnstown. Whether the 1912 meeting will be held in Pittsburgh cannot be told at this time, although it has been many years since Pittsburgh had the opportunity to "do the honors".

A PRACTICAL MANUAL OF STEAM & HOT-WATER HEATING

BY EDWARD RICHMOND PIERCE

SECTION XXI.

Of this brilliant and capable group of men the only one to place in print any considerable amount of the great fund of knowledge he had gained by study and experience is Robert Briggs. In the "Proceedings of the Institution of Civil Engineers" are to be found many things presented by him. About 1882 some of these papers were collected and published by D. Van Nostrand Co., of New York.

Mr. Briggs became associated with Walworth and Nason in 1846 and therefore can be clearly called the most competent authority possible, to decide as to the friction-demands of the fittings which are still made upon the "characteristic shapes and dimensions" established by him.

It is from the data furnished by Mr. Briggs that the Table CZ has been compiled. It seems probable to the writer that one of the reasons that the trade at large has not become conversant with the tremendous effect for trouble that the friction of fittings may have on a given job, is because the few authorities who have given the matter attention have quite generally led up to it through formulae that the average working steam-fitter did not fully comprehend. Another reason possibly is that the great majority of the steam-fitters of the present day have secured their notions as to the detail of the work from trade catalogs, traveling salesmen who might or might not have had some engineering skill, and to a very large degree from the "lay-outs" which different manufacturers of boilers or radiators were, until within a very few years, prone to furnish to the purchasers of their material.

Naturally, if the manufacturer or his engineer understood all about the effect of fittings on pipe sizes he did not explain the thing to the customer, rarely saying anything more than that "the pipe sizes as given must not be changed, or any changes made in the connections without consultation with the one who furnished the plans."

From 1862 to about 1892, the practice of furnishing piping plans to any one who would buy boilers was the universal habit in this country. In this way men who were totally incompetent for the work came in time to the doing of the plan-making work for some of the manufacturers. That the results were not more disastrous than they often proved is a matter of wonder to some of those who look back upon those days from the standpoint of present knowledge.

It is with full knowledge of those days in mind that the writer is giving so much space to this subject of pipe and fittings. It is not to be wondered at, I think, that the trade at large is not familiar with this most important thing in regard to piping, when one looks up the trade-papers for the past 30 years and finds what a very small amount of information given in plain English and clearly stated can be found in them, information as to piping resistance and the like.

In 1906, a gentleman from Montevideo, Minn., addressed a letter to "Domestic Engineering" asking for information as to pipe-sizes. Thirty of the best fitters and engineers in the country answered the inquiry.

Not one of them gave out figures that in all respects agreed with any other one! It would be totally impossible to find out from any or all of these 30 answers how to bring all these conflicting sizes to one common basis and from that base to find the velocity required by each, the probable drop in pressure in order to locate height of main above the water-line, or what percentage to add for fittings. It is perfectly evident from the replies that some of the writers had these things in mind, but no one seemed inclined to explain them. Out of the 30, one only gave a statement of the results in pipe-sizes required to supply 25 lb. steam through 100 ft. of pipe at four different velocities. **But this one gave no hint of the needed increase in pipe size if the fittings taken off the main increased the friction to equal another 100 ft., if same drop or distance between main and water-line was to obtain.**

Four lay stress upon velocity, but give nothing to enlighten the inquirer as how to determine in advance what the probable velocity will be in any given case. Four others pay considerable attention to pressure at boiler, but give no adequate advice in regard to how this may affect the size of the main pipe. One writer gives a comprehensive list of pipe sizes suggested by a number of authorities, some of which are made use of in Table BZ, in connection with others in the present discussion, but fails to reconcile the differences between the figures beyond showing the great diffffferences in velocities. One, only, states the back-pressure, saying "that his tables are calculated on 12-in. back-pressure." One gives a fine description of the relative values of drop-distances, but does not explain how these distances are to be obtained by the fitter. One gives Wolf's table of factors for decreasing the radiation for increased length of main, but fails to mention fittings in any way! Out of the 30 answers, only 3 make special mention of the importance of the friction of fittings, and of these, one goes a little farther than the rest, and embodies his explanation in a sentence of 14 words. After placing fittings as the third important factor out of six mentioned, he disposes of it thus: "If a number of fittings are on the pipe I allow somewhat larger sizes." Of the other two who specially refer to fittings one says very truthfully, "Every bend and angle produces friction." He refrains from giving the Montevideo, Minn., man, or others, any specific information as to the method of finding out how much this friction might be or how to provide for it in the pipe.

That this matter of pipe sizes for mains is considered of paramount importance is shown by the appointment by the American Society of Heating & Ventilating Engineers in 1906 of a very able committee to secure data from members of the society upon "standard sizes of steam and return-mains". This committee made its final report, it is said, in 1907. In concluding their report this committee said: "In regard to the recommendation of a 'standard', their investigations have led them to the conclusion that the use of such a velocity as will require a difference in pressure of not more than one ounce to 100 ft. in **straight pipe** to maintain it, represents, as near as they can at the

present time ascertain, the best average practice in proportioning the sizes of steam and return-mains." This committee prepared a table of the highest, lowest and average sizes, from the data received by them from the members of the society. From this table, which is only partial reproduced here, just one size will be taken to illustrate the danger of taking any table, which is ready made, as a guide in selecting a main for house-heating.

From the Report of Committee of the Society of Heating and Ventilating Engineers.

TABLE DZ.

"Maximum amount of radiation permitted on low-pressure steam-main in plants of moderate size, or those not having over 100 ft. of main".

Condensed from an article in "Domestic Engineering."

Size Pipe	Highest	Lowest	Average
1 in.	100	40	59
1¼ "	125	75	94
1½ "	250	126	171
2 "	400	286	335
2½ "	700	500	594
3 "	1280	800	994
3½ "	1600	1100	1407
4 "	2560	1500	1971

The average in above table is said to have been made up from all the data supplied to the committee, and probably is the fairest presentation of the average practice of the highest type of steam-fitters in this country in 1906 that can be procured.

Assume one of these new types of houses patterned somewhat after the bungalow of the far west, which calls for 8 radiators having a total of 332 sq. ft., all on one floor. Mr. Fitter looks at the Society's table and finding that it gives a leeway between high and low of 114 ft., with an average about what his job calls for, decides to use a 2-in. main for a two-pipe lay-out. He finds that the total run of pipe will measure 70 ft. As this is 30 ft. less than the length upon which the table is said to be based, he feels very confident that the job will be perfect, and will not show a greater decrease in pressure than one ounce.

When the time comes to put it up, he decides to make sure that no trouble with water-line being unsteady shall occur, and so he runs the pipe full size for the entire 70 ft. The cellar is none too deep, and he finds he has not a large drop, but this does not seem dangerous, considering that 30 ft. In time the job is tested out. Then begins trouble for Mr. Fitter, and Mr. Boiler-maker, and Mr. Owner. By the time a 2-lb. pressure shows on the boiler-gage, the water-line is jumping furiously. The reason is not hard to find for the man who has at his command tables, Y, AZ, and CZ. From table CZ he find that the eight 2-in. tees on the main require 82 ft. 8 in. of straight 2-in. pipe to equal their friction. The 9 elbows require 62 ft. more, so that he has a total length of 215 ft. instead of 70 ft. to reduce pressure. By table AZ he finds that with 220 ft. in length he can only carry 67 per cent of either amount given in the Society's table and maintain the "standard" loss.

This means then that his method of piping, while giving all the relief possible, still has produced such a loss in pressure by fitting-friction that, under the highest estimate of any fitter reporting to the committee, not over 268 sq. ft. could have been used and maintain the "standard" pressure, while the average of them, whose practice he thought he was taking, would only use 224 sq. ft. on 220 ft. length of straight pipe, or its equivalent in friction.

If the fitter had started his job from Table Y, and when he had it sketched out roughly, so that he could count up the fittings on the main, had added to the first measured length the equivalent length as found by Table AZ, he would have soon found that in order to maintain the "standard" pressure at return end of piping that he must increase the area of the main 33 per cent. With this much added the Society's rule in this case would have been correct.

Neglect on the part of the fitter to count the heating surface contained in the surface of the piping is an almost universal habit among fitters who do not give their entire time to the business, and with some who do, I regret to state. This neglect often causes serious trouble to the man who was so foolish as to neglect to take into his figuring the probable loss from this source. For instance, in the case just illustrated, without taking the loss from this source into the account at all, we found that the 2-in. pipe was overloaded 107 sq. ft. But in order to get the full amount of the trouble that would be coming to the fitter, we must add, to the 332 ft. of radiation he had put in, the 117 sq. ft. of heating-surface which the pipe itself contained. With this added the simple fact is that the fitter was trying to maintain "standard" pressure for 449 sq. ft. of surface, on 215 ft. of 2-in. pipe-friction! This being over 10 per cent more radiation than the table prepared by the committee of the Society of Heating & Ventilating Engineers claimed to be the highest permissible to be carried by a 2-in. pipe for 100 ft. The number of square feet of surface which the measured length of any given size of pipe in common use will contain can be figured from Table EZ. This table also shows the actual internal area of the different sizes of pipe. In cases where very close figuring for water-line is required, this table can be used in the place of Table A, of the area of circles. As a matter of fact, the actual area of most sizes of pipe is a shade larger than the area given for a circle of the stated size. There is one notable exception to this, and that is on the 2½-in. size.

TABLE EZ.

Table of Important Dimensions of Steam-Pipe in Steam-Heating.

Nominal Diameter.	Length of Pipe in Ft. Per Sq. Ft. of External Surface.	Actual Internal Area in Sq. In.
½ in.	4 ft. 6 in.	.3048
¾ "	3 " 8 "	.5333
1 "	3 " 0 "	.8626
1¼ "	2 " 4 "	1.496
1½ "	2 " 0 "	2.038
2 "	1 " 8 "	3.356
2½ "	1 " 4 "	4.784
3 "	1 " 0 "	7.388
3½ "	0 " 11 "	9.887
4 "	0 " 10 "	12.730
4½ "	0 " 9 "	15.961
5 "	0 " 8 "	19.990
6 "	0 " 7 "	28.888
7 "	0 " 6 "	38.738
8 "	0 " 5½ "	50.04
9 "	0 " 4½ "	62.73
10 "	0 " 4 "	78.839
12 "	0 " 3½ "	113.098
14 "	0 " 3 "	159.485

It will be noticed that the internal area of pipes do not fully agree with the area of circles as given in Table A. This is because the actual internal area of steam-pipe is not in exact accord with the nominal area. A 2½-in. circle by Table A has an area of 4.908 sq. in., while a 2½-in.

steam-pipe by Table EZ is found to have an area of a trifle less. But on nearly all sizes the actual pipe-size internally is a little larger than that given in Table A. Table EZ is given here because there often comes places where it is of the utmost importance to the fitter to use the smallest pipe possible and hold the desired velocity. Probably error in the use of 2½-in. pipe is more general than on any other size, for the reason that it is not in excess of area in sq. in. as is the case with most other sizes. Again, the average fitter seems to have a great aversion to reaming the ends, and when this is not attended to the area of the pipe is considerably decreased, often to such an extent that the effective area of the 2½-in. pipe, instead of being 4.784 sq. in., is found to be not above 3½ sq. in., a deficiency large enough to upset completely any very close figuring on a water-line proposition, for instance. What has been said in regard to 2½-in. pipe is equally true of all sizes of pipe in the matter of reaming the end of pipe to be used in steam-fitting.

(To be Continued.)

THE PLUMBER AND THE LIGHTING TRADE.

Plumbers, who are carrying lighting lines, have started to realize an increase in their business, for with the approach of October and longer evenings the demand for new things in lighting effects grows.

Some exceptional clever offerings are to be had this year, both in shades, domes, and brackets. In the shade lines there are many handsome new creations both in the glass itself, and the after-treatment. In the new brass effects, the brushed-brass lines appear to have the call, although the art-metal offerings are proving to be the real live-wires when it comes to making sales.

The reasons for the latter condition is explained by the fact that the buying public is not taking to the all-glass shades for the gas-portables or for the electroliers. When the art-metal shade or dome is used and perchance it falls and breaks, it often happens that only one piece of the glass under the metal is broken and it can be replaced for probably a few cents. To have the all-glass shade or dome fall, the only thing the owner can do is to replace it with a new one, and at the same cost of his original purchase.

Large buyers of domes, shades and reading lamps are ordering more liberally of the art-metal and glass lines than heretofore. At the same time they are disposing of these stocks more rapidly than the other lines.

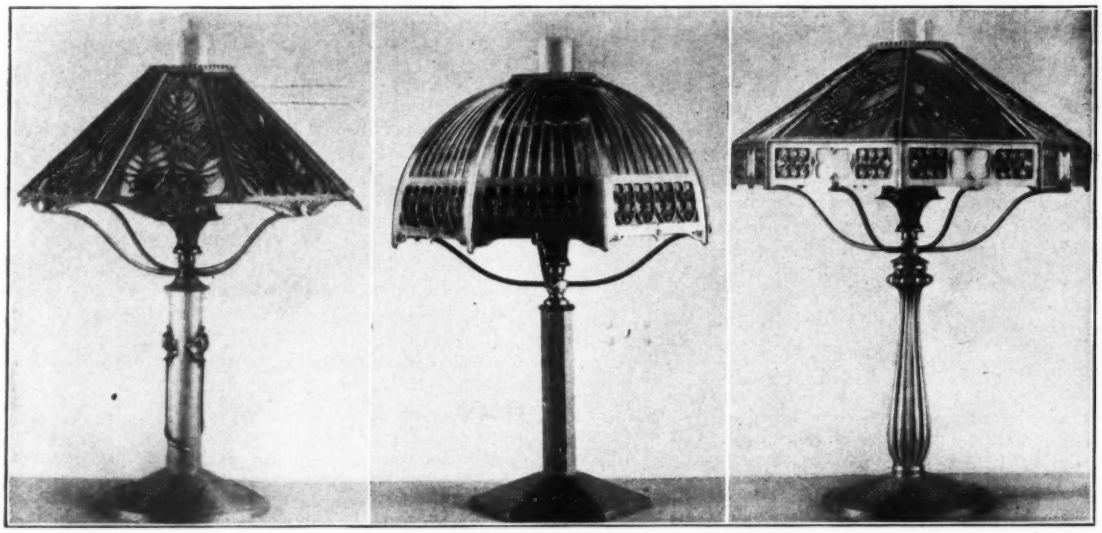
In the shower effects, those for the use of gas are being shown in some elaborate forms, and while these can be had for reasonable prices, there are some of the lines that will show a good profit for the plumbing firm. Several creations in the showers are to be had in either four or six smaller lights and with a larger one in the centre.

In connection with this department there is shown this week, three of the very latest creations in the gas-portables or reading-lamp lines. There is ample evidence that trade in the reading-lamp lines is steadily increasing, and with proper assortments on display, dealers are finding some very liberal business.

The three illustrations are shown because they depict the most pleasing effects in the art metal lines of shades. It can be readily seen that when one piece of glass in the shade is broken it can be easily replaced, and yet the metal part of the shade is unharmed.

When the light is turned on under these shades, the most brilliant effects are to be obtained. At the same time, the shades are of a character that throw the light in a most generous manner over the table and directly upon the paper or book that is being read.

Standards of the portables illustrated vary in height, from 12 to 14½ inches. The width of the shades also varies from 14 to 16 inches from center.



New and Graceful Light-Distributors for Your Customers' Homes.

Plumbers who are specializing the lighting lines will make no mistake in carrying a liberal stock of this class of goods, or to have on hand an assortment of photographs from which customers may be enabled to select some other, but probably more elaborate, offerings.

How They Do It.

In a hotel in Montana is the following notice:

Boarders are taken by the day, week or month. Those who do not pay promptly are taken by the neck.

A PLUMBER'S DIARY

BY PHOENIX

XV.

On "Uncle Sam's" Work in the Sunflower Land.

It's a long, hard and dusty road that doesn't have any "huckleberry" bushes down at the farther end of it, as you begin to arrive. Time and time again one may get the worst of it or be lost almost entirely in the shuffle, but things are just bound to take a change after a while, if you only keep on struggling.

"Wasn't Jack lucky to draw that hotel job," I once heard a fitter remark to a friend. "Why, there is five months' work on it, if there is a day." Was it luck, only, on the part of Jack? Did "she" come along and just slam that job right on to Jack, without knowing whether it was "his own"? Somehow they always speak of "luck" as a "she", and so I have done the same thing rather than forsake such a time-honored custom; though I doubt, exceedingly, that "luck" and "she" are always one and the same thing.

When the matter is examined more closely, it will be found that, in most cases, "Jack" rather swung himself somewhat in the way of the "she" called "luck" and was about ready for the job and capable of holding it down. Having thought somewhat seriously along this line for some time, I came to the conclusion that it was a mighty good thing to do, to get prepared for whatever there was in store for me and then not to stand waiting, but to sort of put myself in the way and give "luck" a full swing when it came to the striking act.

I didn't want to bank too heavy on her whims, for the mind of a "she" is fully as uncertain as that of a "standpatter" at election time.

In some previous articles I mentioned the system of writing and of keeping "tabs" on where the work lay, thus having a number of jobs in sight. At the same time I think that I stated that I had bought some books on the subjects of plumbing and heating. To this collection I added at various times, until I carried quite a stock around with me.

These books were all right, as far as they went, but there were many things that they touched upon in anything but an easy manner for the average workman to understand. The man who starts in to learn the trade today has got a "cinch" to what we had at that time, for nearly everything is explained to him in a plain and easy fashion now-a-days.

This fitter, who had been working on Government work, started me to thinking that, perhaps, I might be able to land some such job for myself. So I began to get myself in line. I soon found out that the places were all filled and that the jobs were very desirable, as the contracts ran into good-sized figures, and you were liable to be sent to almost any part of the United States and held on one job from two months to a year, which depended, of course, on the size of the job and your ability to hold it down.

Therefore I began to watch the newspapers and also the trade papers and magazines, and to take note of the firms that landed the jobs. When it all simmered down, I found that there were about a dozen who got the larger contracts. There were others in the field who landed some of the smaller jobs, but the bunch of work seemed to be handled by the number first stated, who appeared to make a specialty of it. Then I watched my chance to get into the swim, but there was nothing doing for a long time, and I began to doubt very much that I would ever succeed.

At last it came about in an entirely unexpected manner. Hence the observations upon "luck" in the first part of this issue. For weeks I had sought to get a job with some of the contracting firms and failed for the reason that the places were all filled. One evening, after supper, I picked up a paper and sat down in the lobby of the hotel to read a while.

After a time I got into conversation with a man who sat by my side and in talking about various things it came out that he was the foreman of a big job of Government work and had come to the city to get some fitters, having had to fire several for having gone on a "tear." I struck while the iron was hot. You bet I did. Showed him who and what I was and applied for a job right then and landed it in less than half an hour. Work in the city was beginning to get a little bit slow, and I had figured that I would have to light out soon anyway.

We fixed it up, that I was to start in the next week, and if I could make good, why there was a chance to hold the place for at least six months. He stood for the transportation, which was also a good point in the game.

Here's where I acquired a trunk. Simply had to buy one to carry all the stuff that had accumulated. Packed up and took a night train out and landed, in the course of several hours' ride, in the land of the sunflowers and where the wind blows for the entire 24 hours, dust and sand thrown in free.

Lord, but it was hot out in that country. The very trees seemed to have been twisted with the heat and to grow only under protest, and that dust was about the "smartiest" thing to the eyes that I ever ran up against. During the year that I was in this country I never saw snow but once and then only about two inches, which lasted for about six hours. I made good on the job and will now tell some of the incidents that happened and also give a few points on the work.

Reformed Too Soon.

An eminent speaker at the Congregationalist meeting in the First Congregational Church, East Orange, was telling the other day of a Westerner's opinion of the East.

"This man," said the speaker, "was a prominent churchman and had occasion to visit New York, where he remained for a few days. In writing of his experiences to his wife in the West he had this to say: 'New York is a great city, but I do wish I had come here before I was converted.'"—Newark Star.

THE FABLE OF THE OAK AND THE REED.

By Henry D. McCormack, C. E.

Once on a time, so the fable goes, a tall, rugged and unyielding Oak grew near the edge of the forest, close to a stream which meandered through a lowland meadow. In the meadow, tossing and waving with every gust of wind that blew, was a field of Reeds, slender, pliant, flexible and frail. The magnificent Oak from its top on high, looked down with contempt on its weaker neighbor; and once when a strong gust of wind had bent the Reeds to the ground, while the Oak stood proudly up, shaking its shaggy top in defiance of the wind, it murmured to the Reeds:

"Oh, you poor weaklings! Why do you bow your heads to every little breath of air that blows? Look at me! I stand up and battle with the wind, and behold! how large and strong I have grown!"

But the Reeds did not answer. They only hung their heads in shame.

One day, though, a terrible storm came that way. Black clouds covered the heavens; the sky grew dark, vivid flashes of lightning lit up momentarily the darkness of the scene, and the wind, in a terrible hurricane tore through the forest, uprooting trees, breaking off branches and leaving destruction in its wake. When the storm had cleared away, the proud Oak was found floating in the stream alongside the Reeds, which waved and tossed their tops as serenely as before.

"Tell me," called out the Oak, as it was being swept away, "why it is that I, who was so large and strong and who battled so hard with the wind, should be overcome and uprooted, while weak, puny you, that was so pliant and yielding, should escape unharmed."

"It is because you were unyielding and inflexible that you were destroyed," answered the Reeds. "When the storm came and the wind blew we bowed our heads to the ground before His blast, then when the storm had died away, we returned to our upright position unharmed."

The fable of the Oak and the Reeds could be applied with equal force today to the installation of plumbing systems. Inspectors of plumbing and engineers who have made a practice of studying old work have been struck with the numerous defects in plumbing systems, due to the too rigid method of construction followed, which made no allowance whatsoever for the settlement, shrinkage, expansion, contraction and vibration that are inseparable from all building construction. Tall buildings, for example, vibrate to such an extent that ordinary pendulum clocks cannot be kept running on the top floors, while tall chimneys sway from six to eight feet in windy weather.

"Good Gracious!" exclaimed a young engineering student, peering over the top of a high chimney which was being topped out by the masons, "this chimney will fall! See how it sways!"

"Don't you worry," replied an old chimney mason, quietly proceeding with his work. "So long as the chimney sways there is no danger, but when the construction is so rigid and inflexible it cannot sway with the wind, down it will come. Flexibility in chimney construction is what saves them from disaster."

All of which goes to show that, however imperceptible to the casual observer, there are movements taking place in buildings at all times which cannot be seen, cannot easily be measured, yet nevertheless take place they do and the forces exerted are irresistible even though imperceptible. The National Capitol at Washington is 4½ in. longer in summer than in winter and the contraction and expansion of that building must, and does, affect everything in the nature of piping rigidly attached to the superstructure.

Just pause for a moment and consider the number of conditions or forces which affect a drainage system once it is installed.

First—In very tall buildings, there is a sway and a vibration which transmit themselves to all the piping.

Second—Expansion and contraction of the stacks in tall building is a factor to be provided for.

Third—In all kinds of buildings, from the smallest cottage to the tallest office building, the floors shrink, as the

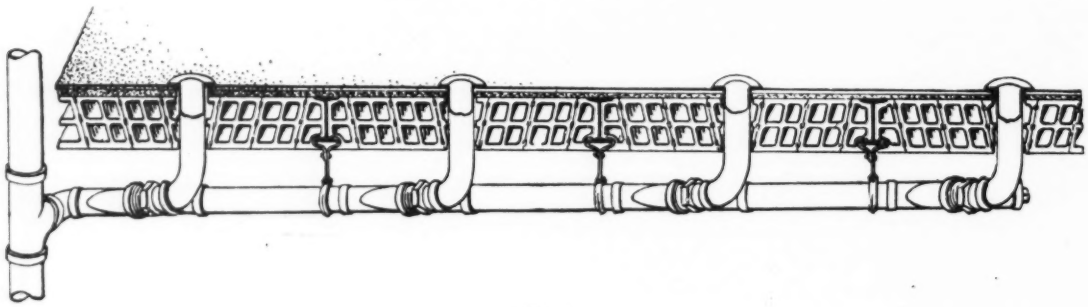


Fig. 1.

materials of which they are constructed dry out. This can be seen by the numerous closet-bases held rigidly above the floor where the floor-beams shrink, and the inflexible lead or iron bends hold the closet rigidly out of place.

Fourth—Buildings all settle into the foundation soil, and the walls themselves settle and shrink as they dry out and the weight of the superstructure is added to their own weight. Thus, when the stacks are supported independent of the walls and floors, the closets are held rigidly above the floor line a distance equal to the settlement. When the stacks are attached to walls and floors, the crushing force of the settlement will break the fixture-connections unless provision is made for the settlement.

Fifth—Settlement or shrinkage of walls or floors sometimes swings fixture-branches, or toilet-room branches, to one side so that unless provision is made for the movement, something will have to go.

When all these forces operating to affect a drainage system are taken into consideration, the mystery is removed and it is a mystery no more why so many joints in soil-pipe are defective a few years after being installed, although perfectly tight when put in. When these various settlements and shrinkages occur, something must give, and if the construction is a rigid one, the joints of soil-pipe, which are the weakest parts, yield to the pressure and the damage is done. Often the construction is such that the calked joints cannot yield sufficiently, and branch-

connections, closet-bends, floor-connections to water-closets and other parts of the system are the ones to go.

The secret, then, of permanently tight plumbing, like the secret of the Reeds, is perfect flexibility and adjustability of the parts, so that floors can shrink, walls and floors can settle, stacks or pipes can sway and vibrate and the system as a whole will withstand the several forces acting upon it, while the various parts will adjust themselves automatically to the changed order of things, after each settlement, shrinkage or sway, without damage to the fixtures or injury to the system. In tall buildings, more or less of an effort has been made in the past to provide some flexibility to the system by putting in swing-joints at the various floors where toilet-room connections are taken off, and by connecting each closet with a Y-branch laid horizontally and a lead bend connected to the branch of each Y, as shown in Fig. 1, so that a certain amount of "give" would be experienced when the settlement occurred. Such a method is cumbersome and expensive to say the least and the writer was privileged recently to witness some tests of a flexible lead fitting which is destined to take the place of the cumbersome construction thereby simplifying and cheapening plumbing installations at the same time.

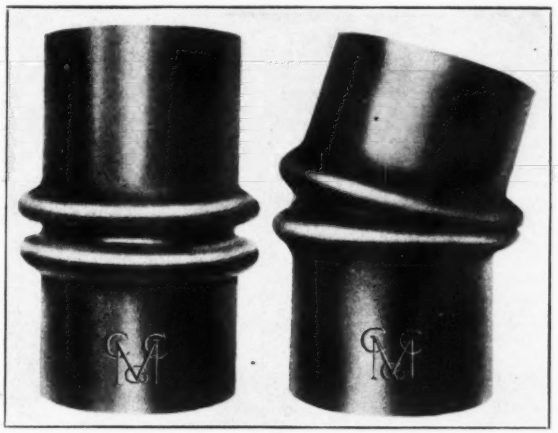


Fig. 2. Fig. 3.

In a paper presented at the meeting of Inspectors of Plumbing and Sanitary Engineers, held at Trenton, N. J., in January of this year, J. J. Cosgrove mentioned a flexible pipe made of lead and in straight pieces or in the form of long and short bends. It was only recently, however, that the writer was able to secure one, or at least examine one that had been procured for experimental purposes, and to witness the tests made thereon. A good idea of the appearance of a straight piece of flexible lead pipe with the corrugation, or folds, in their normal condition can be had by referring to Fig. 2, which is a photographic reproduction of the experimental trial piece. The pipe was 6½ in. long, 4 in. in diameter, and was made of lead weighing 8 lbs. to the foot. The flexibility of the pipe consisted simply of a couple of corrugations extending circumferentially around the pipe. To all appearances and to the touch, this pipe was as rigid as an ordinary piece of pipe of the same length. To test the rigidity, however, the experimenter put the corrugations to his knee and gave the ends a quick pull with his hands. To the gratification of everybody present, the folds or convolutions of the pipe yielded gracefully to the pressure, and the pipe took the tilt or bend shown in Fig. 3. After leisurely examining the bend and commenting on the value of that one feature alone in plumbing practice, the manipulator once more took the pipe in his hands and with a few quick pressures, forced it into the collapsed shape shown in Fig. 4. At this point out came a dozen rules and the flexible pipe was measured a score of times, each person present anxious to note for himself the distance the ends had been forced together. One and all rules recorded 5½ in., showing thereby a collapse of one inch from the normal. Interest was running high at this point and we all were anxious to see to what extent the pipe could be stretched. A few more movements of the manipulator's hands and the pipe took the form shown in Fig. 5. Once more the rules were in requisition and this time they recorded a length of 7½ in., a length of one inch over the normal, and a length of two inches more than the collapsed form.

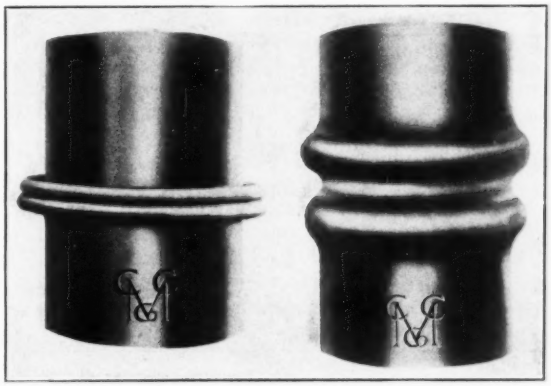


Fig. 4. Fig. 5.

Just think what such an innovation means to our present-day rigid system of construction. In its simplicity it means a play of two inches to every floor of the building. Fancy a system of construction wherein the stacks are supported at their bases, and at each floor of the building the stacks tied to the superstructure so they could work up or down, but not sway to the sides. Then consider the fixtures resting on each floor being connected with flexible lead pipes or bends. Could anything beat such a construction? Let the floors shrink! Let the walls

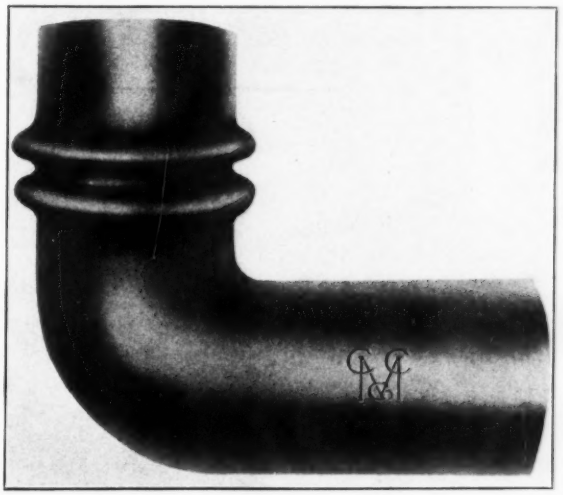


Fig. 6.

shrink or settle! Let the pipes and stacks sway or vibrate, the fixtures and system would be perfectly free from damage or injury. Then, the practice now followed by the Supervising Architect's office at Washington can be generally followed, and all water-closets be bolted rigidly to the floor as well as to the floor-flange. So bolting them will insure their being held with their bases level on the floor, with no crevice beneath for the incubation of bugs or collection of dirt.

It ought to be here stated that after all the manipulations the lead trial piece was subjected to, and it was worked over by dozens of hands, it is in as good condition now, so far as an examination can determine, as when we made the original examination before the pipe was tested.

All of the illustrations shown so far are of a short piece of straight pipe. It might be well to here note that stock straight pieces are made in various weights and in of any length or any number of corrugations may be had on order. Also, that flexible connections are made up in the form of bends. One form of bend is shown in Fig. 6. This bend was not used in the experiments and is here reproduced only to give an idea of the variety of flexible connections available. Long, short and extension bends of various weights are made, and short lead bends may be had corrugated either on the long or the short leg.

To the plumbing systems of the future, it will be safe to say, the flexible lead pipes and bends will be the Reeds of the Fable, which will bow and yield to every strain on the system, and after each strain adjust themselves to the new condition of affairs without damage or injury to piping or fixtures. They will be at one and the same time an investment and insurance against loss.

PARKER BELIEVES IN DISPLAY.

We take pleasure in illustrating the exterior and interior of the establishment of F. M. Parker, 714 W. Pico St., Los Angeles, Cal. Mr. Parker stepped over the dividing line between journeyman plumbing and master plumbing on Feb. 1, 1889, and opened up a shop for himself for the conducting of a plumbing, gas-fitting and heating business. The illustrations give some measurable idea of his success in the business, which has been continued without interruption up to the present time. Mr. Parker is the only one doing business in Los Angeles at the present date out of those that were engaged in

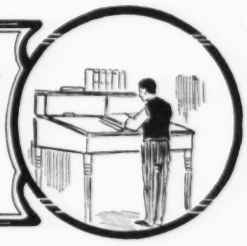
F. M. Parker's Attractive Plumbing Establishment at Los Angeles, Cal.

plumbing enterprise in that city in the year of his commencement. He has installed his work and wares in many important buildings. Among these may be mentioned the Los Angeles County Court House, the buildings of the County Poor Farm and the County Hospital, the Indian School of the U. S. Government at Perris, Cal., a building at the Soldiers' Home at Sawtelle, Cal., and the Masonic Temple at Los Angeles. The arrangement of the store fixtures and goods was commented on favorably in detail in a recent issue on our picture page. Mr. Parker displays similar good taste in the choice of his letter-heads, the lettering being embossed, printed in red, with a background of light yellow.

Up-to-Date Showroom in F. M. Parker's Plumbing Establishment at Los Angeles, Cal.

BUSINESS MANAGEMENT

NEW METHODS FOR OLD



ESTIMATING COSTS.

Editor "Domestic Engineering": I have been very much interested in your department of "Business Management," and the questions asked by some of your readers. Having had 16 years' experience in the plumbing and steam-heating business, first as apprentice, then journeyman, later as bookkeeper, estimator and office manager for plumbing contractors, and now being connected with the wholesale plumbing supply-business, I have frequently run up against some of the same questions and difficulties as your inquiring readers.

There is an old saying "That to properly train up a child you should begin with the grandparents," and so to train up the master plumber in modern business management, you should start with the apprentice boy. The head of a business has now to think of many things about which he never used to trouble himself in earlier days; and these are just the kind of difficulties for which the ordinary training of the workshop affords the least preparation. It is very rarely that the mechanic, who engages in business, has had the advantages of any business training, and often has but very little education. Against this, however, must be set the advantages that the workingman today has of improving himself by the newspapers, trade journals and magazines, from the work of the trades unions and co-operative societies, by attendance at the evening classes of the commercial schools, or by taking up a course in some good correspondence school.

Before there can be any great success in any department of life a careful preparation must be made for it. Colonel Roosevelt just recently told the farmers that they ought to avail themselves of expert advice from technical men, and not be content to go on without improving their methods of farming. So in the plumbing and steam-heating business, the apprentice boy, journeyman and master plumber should try to improve their knowledge, by availing themselves of the expert advice from technical men, which can be obtained by reading such excellent trade journals as the "Domestic Engineering" and "Plumbers' Trade Journal." They should also keep a scrap book, binder or folder for preserving such clippings or articles that are of especial interest and importance regarding the technical part of the plumbing business, or any other valuable data. Where one does not wish to mutilate his magazines, a good plan is to keep a memo book or diary and make a note of any special article that you may wish to refer to again, indexing it in proper manner, with the name of the article, name of writer, date and name of magazine in which it appeared, and on what page it can be found.

The apprentice boy and journeyman should be encouraged to keep a diary, not only to record any valuable data or information they may gather, but also to keep a record, made up from the various jobs they have worked upon from time to time, showing how much time was spent on the different parts of a job, or on the various fixtures in a house, how long and how much help was required to make connection with sewer in street, set trap at curb, and run drain from street to house, connect up rain-spouts and hydrant-cess erect and test the soil-pipe stack, connect up the water-supplies and wastes to fixtures, making a separate note of the time it takes to connect and set up boiler and sink in kitchen, or the lavatory, closet and tub in bath-room; how long it takes to run the gas-piping and proving same; and comparing the time required on each style of fixtures on the various jobs from time to time. Just consider what valuable information his diary would contain for future estimating and contracting, when the young plumber is finally launched in business for himself. If he knew that the average time for fitting up a bath-room or lavatory of a certain style takes so many days, how easy it would be, by simple addition or multiplication, to figure up how much time it would take to fit up five, six, a dozen or more bath-rooms, as the case may be, in a large hotel or building. If it takes so much time to run so many feet of soil-pipe, gas main, or water-supply, how simple it is to double or treble it, or estimating for any length required, making extra allowance for fitting around each fixture. If every complicated job is reduced to its simple elements, such as so many sinks takes so many days, so many bath-rooms so much more time, so many feet of drain-pipe to run will require so many days, so much time to erect and prove soil-pipe stack, so much time for the water-connections, and so on for each part of the work to be done, how easy it becomes to sum up the total time it will take to complete a job, no matter how simple or complex it may be.

When it comes to doing business at a profit, each part of the work must pay for itself, and to properly estimate the whole time on a job, and also to intelligently follow up the workmen when at work, we must know the average time it takes to do each part of the work, whether running the drain, water, gas or steam-pipes, setting the boiler, putting in the sink, lavatory or bath-room fixtures, as the case may be.

Yours truly,

Haddon Heights, N. J. Wesley A. Fink.

WHERE DO THEY END UP?

Editor "Domestic Engineering":—I listened to a rather good story, the other night, and I am going to repeat it, with slight variations, for the benefit of your readers. It goes like this:

A certain price-cutter died. This is what happened. Some little time after, his wife got anxious to have a talk with him and so she went to a medium and paid $2.00 for the privilege of having him called up. He was located in Heaven all right but wasn't exactly satisfied and seemed to have yearnings for the earth.

After about six months the wife wanted to have another talk with her departed husband and so she went to the same medium and got her to put the call through for the second time. Strange to say they could not locate the husband. Finally they tried the lower regions and they located him. "How did you come to get in there," the wife asked. "Oh, I got into Heaven on another fellow's recommendations and when he showed up they moved me down here," he replied. "Well how do you like it?" she asked. "Well," he answered, "Heaven is all right enough for climate, but this is the place for society and I feel more at home." G. B.

WHAT'S ONE MAN'S MEAT, IS ANOTHER MAN'S POISON.

Editor "Domestic Engineering":—I read what, to me, was a most instructive and interesting affair in one of the papers a short time since, and I believe that the matter will bear comment in these columns of the paper that you are making so helpful to us all.

It seems that two contractors obtained contracts for jobs that were as near alike as two peas. The first contractor lost several hundred dollars while the second one made something like $2,000 as I remember the article. These amounts may not be accurate, but the fact remains that while one man lost, the other made a handsome profit, and the jobs were practically the same.

I do not know of anything that showed up plainer the value of having a system and of one's knowing his own business and seeing to the things that must be done.

As the man, so the business, I take it. If a man is easy, slipshod and indifferent, the whole business will partake of those qualities, while if he is alert, aggressive and gets after matters why they must come out just about right. It's a sure thing that system pays and that it pays big to the man who will install and follow it up.

F. D.

SOME DEFINITIONS FOR PERUSAL.

Editor "Domestic Engineering":—I see that in the issue of Aug. 27, "Hucem" asks for the definition of a sanitary expert, sanitary engineer and also some points regarding the plumbing inspector. So here are the answers;

1. A sanitary expert is a masculine "Mary Jane Holmes," fully as voluminous and about as effective.

2. A sanitary engineer is the man who sometimes directs the spending of the money. The power behind the throne, most emphatically, has the authority to say that this man is an engineer.

3. A plumbing inspector is many times a retired journeyman. I came near making a mistake and getting it, a tired journeyman. To make the thing a dead-sure cinch a leaning toward "Tammany tendencies" will be found mighty effective.

I have tried to follow your own most excellent style of question and answers and will state that, of course to the rule, there are some exceptions. "Hucem" shouldn't let his goat be got. Get the inspector's.

Deacon Dodger.

THE INQUSITIVE MAN SQUARES HIS SPANKER BOOM.

I wish that we could get a few more "Hotfoots," Strawfoots "Dodgers" and Codgers to come across with a little of their practical wisdom. What we have had has been mighty interesting, and I am going to fire three or four more shots in this week and shall hope for results. Look out now:

1. Would it be a good plan to keep the office open evenings at least a part of the year? Other businesses do, why not ours?

2. Does it pay to use a tool, full speed and to the extent of its strength? Or would you slack off a bit on general results?

3. Speaking generally, what wages will the business stand? Is $3 a day enough, or $6 too much? Seems like there should be some way of getting a general average on this so one would know where to get off at.

4. What argument would you use to sell a man a better bath-room outfit than the one he was intending to buy? We will say that he is trying to get the cheapest line he can that will stand up. Now how would you go about this matter? I know full well that the old chestnut has been sung "it pays to buy good goods." Let's see if we can't find something different: some other way of going at matters just to see, if there are real good reasoning heads down in the business. A fellow told me the other day that all plumbers were pumpkinheads, and I came pretty near knocking his block off. This will be the test. You're off.

THE SUCCESS OF FAILURE.—QUESTION?

There is a question that the editor of this department has long desired to put across to the readers who are following this department, yet the matter touches so closely the innermost part of each man's life, that the interrogation has been postponed from time to time and it goes abroad right here.

Have you ever made a complete and blooming failure of all things, I do not mean as strictly pertaining to business, but the whole gol-durned thing? You may, if you so desire, make the question refer to jobs, business, and the affairs of life.

Some of the best successes known have been made after years of failure along other lines. The man (or woman) would finally "strike the proper gait" on the "home-stretch" and more than make up for lost time.

Can you not tell us about it and how you came out on top of the heap? No names will be given. That goes without saying. The advice or experience of a man who has succeeded, after years of failure, is worth more than four dozen rules for success written by amateurs aged 23.

Let us have some of these experiences, for the writer knows full-well that there are hundreds and hundreds of them all over the country.

A FIRST-CLASS OFFICE MAN.

Editor "Domestic Engineering":—After reading the "Minnesota" article in your excellent journal, which was entitled "A First-Class Office Man," it struck me that it had been written for fun or just to see what the answer would be. He asks the broad-minded bosses to answer his question. I don't happen to belong to that class, but I am on the side of the fence with the office man, and if there are no objections, I would like to say a word on the subject. In our friend's statement of the duties he thinks it necessary for a first-class man to be able to discharge, he states that a first-class man is equal to the proprietor in every respect. He must run the business as if he owned it, but must show a profit. Why then shouldn't he be paid a salary and commission of the profits made in the business to equal nearly the income of the proprietor less six per cent on the capital invested by the proprietor, all the above, of course, based on the supposition that one man could do all the work necessary to keep 25 to 50 men employed constantly.

Could the proprietor do it? Ought one man ask another to do what he can not do himself? This first-class office man must fill the positions of four pretty good men in any shop that employes 25 to 50 men, all the year round. If there were 10 men, it could be done, but the man would have to be a hustler.

1. A good bookkeeper would cost $100.00 per month, and would be kept busy seeing that all material was charged up for the previous days' sales, waiting on cus-

tomers, making day-book charges and keeping the office neat and clean, answering phone calls and correspondence, buying goods, and keeping men's time.

2. Stock-keeping is one man's job alone in a shop of 25 to 50 men if done right, and a good stock-keeper is worth from $15.00 to $18.00 per week. He must know just what stock he has in hand, and be able to tell the boss or the bookkeeper right now without having to go the line or the pipe-rack, just how much of this or that is on hand so that when the buyer is buying, he wont overstock or buy short on a staple thing. He must get ready all orders for material for jobs and contracts and charge same to its proper jobs. He must receive all material and check it from the freight and express companies, and material returned from the different jobs after they are executed, entering the same up on his books or cards kept for this purpose, so he knows always what material is on hand and what was used on a certain job or contract. Between times, he is straightening out his stock and cleaning up the stock-rooms and shop and doing little odd-jobs that come to every shop, even cutting pipe to sketch.

3. A good collector is the main-spring of the whole works. His salary ought to be equal to the bookkeeper's, $100.00 per month, and if he tends strictly to business, he will have all his time taken up, collecting the money, adjusting claims, examining the defective work that customers think they are paying for, and keeping his eyes open for new business, besides helping the bookkeeper in the office at the last of the month, getting the bills ready for the 1st day of the next month.

4. The estimator, the man that must know how the job will look, when it is finished—the man that can see it all in the mind's eye—knows just how many ells, tees, nipples, unions, valves, hangers, feet of pipe, bends, ferrules, bolts, screws, fixtures, etc., it takes to make up the details of a job. He is the man that the 25 to 50 men have to depend on mainly for their jobs. He has to hustle all the time to figure enough work to keep the bunch busy, because if he gets 25 per cent of all work he figures on, he is getting about the average amount, take it year to year. He ought to be worth $150.00 per month. He is kept busy figuring plans, going to the building to figure and measure, visiting the big jobs to see that all is going as it ought to, that no material is being wasted, and that no careless work will spoil the working effect of the job, also seeing that the men have plenty of material to work with and that tools are kept up, so the men can do the most work in a given time, thereby keeping within his estimate. He must keep in close touch with all new prospects, with the bookkeeper and the stock-keeper, so that he may be able to figure on all work and know from the bookkeeper if the costs of the jobs are within his estimate, and with the stock-keeper to see that the material is getting out to the job fast enough, and in usable shape, and that no material brought back to the shop is wasted. He also must know that no material is left on jobs after they are supposed to be finished, and he ought to pay a last visit to the job with the owners to see that everything is first-class as per contract, and satisfactory.

The above are the actual duties of the four men that our friend wants, one man to discharge each duty, and every day to keep a bunch of 25 to 50 men busy, the combined salary of which ought to be about $425.00 per month, to say nothing of a typewriter operator, which I suppose your first-class office man could handle also. Then, if this one man can fill the four positions at once, he ought to be worth at least $350.00 per month, and a percentage of the yearly profit, less 6 per cent for the capital invested in the business, for if he is to operate the whole business and make a profit, he is entitled to compensation accordingly, less the invested capital. Personally I would like to be able to fill such a position. I have been filling the estimator's position for several years, but never saw the time for more than a day or two that I could have handled the whole four at one time, except once when I only worked four men.

Little Rock, Ark. A. J. Purcell.

THE FLIGHT OF TIME.

In the rush and scrabble of the every day life, it is hard to realize that Father Time does not stand still, if, perchance we are unfortunate enough to commit that error.

We arise in the morning and perform our duties through the day in a more or less mechanical manner and we are mostly tired enough at night to sit down and rest until retiring. A few follow the dizzy path that ends in a complete smash-up of what is best and good, but one and all seem to lose sight of the fact that the earth is going on each day doing the revolution act and that every day cuts down by one our deposit of time.

This will be the more forcibly brought to the mind if one chances to visit a town or city from which one has been absent for several years. Note the absence of old friends; observe the building changes; the growth of the place; and see the people who have taken your place in the town.

Compare, when the idea begins to break in upon your thoughts, the inventions of that day, long since past, with the various kinds of apparatus that are in use at the present time, and it will begin to dawn upon your mind that matters have been moving a trifle in the past 25 years. Take the trolley lines, for instance, and compare them with the old horse-cars. Take the old-style pan-closet and then get a line on the latest "siphon-jet." Compare the old style "windmill" stock and solid dies with what we now have in the way of the adjustable and you will begin to believe that there has been some advancement after all. The only thing about it is that you had not stopped to think nor had you gotten thoroughly woke up. Have we yet reached the end of the game? Far from it. In fact the show has just about opened. There is room for many improvements along the plumbing line; we have the problem of the sanitary arrangements of the airships to solve. We have yet to get some definite standard in the heating game and so the list might be continued. Let the man who believes that what we have is good enough, awaken from his Rip Van Winkle attitude and get into the real swim. He will find that he has accumulated a big bunch of moss these twenty years that he has been asleep.

Charity and Prudence.

The contradictions of life are many. An observant man remarked recently that he was prowling about a certain city square, when he came upon a drinking fountain which bore two conflicting inscriptions.

One, the original inscription on the fountain, was from the Bible: "And whosoever will let him take the water of life freely."

Above this hung a placard: "Please do not waste the water."—Youth's Companion.

The New Plumbing Ordinance for the City of Galveston, Texas

The board of commissioners of the city of Galveston, Texas, has just adopted a new plumbing ordinance containing rules and regulations for the construction of house-connections with the water and sewer systems in that city and for house-plumbing. The ordinance in full follows herewith:

Be it ordained by the board of commissioners of the city of Galveston as follows:

Section 1. That the following rules and regulations be, and the same are hereby adopted for the construction, maintenance and repairs of plumbing and house-connections with the sewer and water-systems in the city of Galveston, and for the government of plumbing in and for said city.

Rule 1. Every master, employing or journeyman plumber carrying on his trade in the city of Galveston who has not heretofore received a license shall appear in person before the examining and supervising board of plumbers of said city and pass an examination as to his competency, as required by law, but all licenses heretofore issued to master, employing or journeymen plumbers shall continue in force for the term for which they have been issued.

Rule 2. It shall be unlawful for any person to carry on the trade of plumbing in said city unless he shall have received a license as hereinbefore provided. Master and employing plumbers, applying for license, shall file with the board of commissioners a petition as required by article 579 of the revised ordinances of the city of Galveston. No license shall be granted for more than one year, but the same shall be renewed from year to year upon proper application.

Rule 3. All non-resident master, employing or journeymen plumbers who shall undertake to do plumbing work in the city of Galveston shall, before doing so, exhibit to the inspector of waterworks and sewerage plumbing of the city of Galveston a license issued from some duly authorized board.

Rule 4. No licensed plumber shall allow his name to be used by any person or party, directly or indirectly, either for the purpose of obtaining a permit or do any work under his license.

Rule 5. Any master or employing plumber sending a person on a job (requiring a license) in the capacity of a plumber without such person having received a license, shall be punished as hereinafter provided.

Rule 6. The drainage and plumbing of all buildings, both public and private, situated in the city of Galveston, shall be executed in accordance with plans previously approved by the inspector of water and sewerage plumbing of said city. Suitable drawings and descriptions of the said plumbing and drainage shall in each case be submitted and placed on file in the office of said inspector.

Rule 7. Drawings and complete descriptions of all plumbing and drainage shall be filled in with ink on forms furnished by the inspector and shall be filed by the master plumber in the office of the inspector.

Rule 8. One vertical drawing will be sufficient for a building when it can be made to show all work. If the work is intricate and can not be shown by one drawing two or more should be used.

Rule 9. Plans will be approved or rejected within two days from the time of filing. And the said plumbing and drainage shall not be commenced or proceeded with until said drawings and descriptions shall have been so filed and approved by the inspector.

Rule 10. After the plan has once been approved, no alteration of the same will be allowed, except on written application of the owner, architect or master plumber. All information or ruling from the inspector shall be made in writing.

Rule 11. Repairs or alterations of plumbing and drainage may be made without the filing and approval of drawings and descriptions; but said repairs or alterations shall not be construed to include cases where new vertical or horizontal lines of soil or waste-pipes are proposed to be used. Notice of said repairs or alterations shall be filed in the office of the inspector, before the same are commenced, in all cases except where leaks are stopped or obstructions are removed. Said notice shall consist of a description in writing of the work to be done, of the location of the property where the same is executed, and the name and address of owner.

Rule 12. All plumbing completed before the passage of the ordinance adopted March 1, 1906, shall be treated as new work before connection is made with the city sewer system.

Rule 13. Written notice must be filed in the office of the inspector by the master plumber five hours before any work is ready for inspection or begun. No part of the work shall be covered until it has been examined, tested and approved by the inspector.

Rule 14. The entire plumbing and drainage system within the building shall be tested by the master plumber, in the presence of the inspector, under a water-test. The plumber shall securely close all the openings, as directed by the inspector. The material and labor for the test shall be furnished by the master plumber.

Rule 15. All material shall be of good quality and free from defects. The work shall be executed in a workmanlike manner.

Rule 16. All cast-iron pipe used in buildings over 50 ft. in ceiling height above the curb shall be of the grade known as "extra heavy", which weigh as follows:

Two-in., 5½ lb. per lin. ft.; 3-in., 9½ lb. per lin. ft.; 4-in., 13 lb. per lin. ft.; 5-in., 17 lb. per lin. ft.; 6-in., 20 lb. per lin. ft.; 7-in., 27 lb. per lin. ft.; 8-in., 33½ lb. per lin. ft.; 10-in., 45 lb. per lin. ft.; 12-in., 54 lb per lin. ft.

Rule 17. All lead supply-pipes shall not be lighter than extra strong lead. All lead waste and vent-pipes shall not be lighter than D lead, which weighs as follows:

For Supply Pipes.

Three-eighth-in., 1 lb. 8 oz. per lin. ft.; ½-in., 2 lb. per lin. ft.; ⅝-in., 2 lb. 12 oz. per lin. ft.; ¾-in., 3 lb. 8 oz. per lin. ft.; 1-in., 4 lb. 12 oz. per lin. ft; 1¼-in., 6 lb. 12 oz. per lin. ft.; 1½-in., 7 lb. 8 oz. per lin. ft.; 2-in., 9 lb. per lin. ft.

For Waste and Vent-Pipes.

One and a quarter-in., 2 lb. 8 oz. per lin. ft.; 1½-in., 3 lb. 8 oz. per lin. ft.; 2-in., 4 lb. 12 oz. per lin. ft.; 3-in., 5 lb. per lin. ft.; 4-in., 5 lb. 6 oz. per lin. ft.

Rule 18. All joints or seams on lead or between lead and brass shall be soldered by wiped joints.

Rubber couplings or slip-joint connections shall not be used on any waste, vent or water-pipe of any fixture.

Construction of Work.

Definition of terms:

The term "house-drain" is applied to that part of the main horizontal drain and its branches inside the walls of the building and extending to and connecting with the house-sewer.

The term "soil-pipe" is applied to any vertical line of pipe extending through the roof receiving the discharge of one or more closets with or without other fixtures.

The term "waste-pipe" is applied to any special pipe extending through the roof, receiving the discharge from any fixtures except water-closets.

The term "vent-pipe" is applied to any special pipe provided to ventilate the system and to prevent trap siphonage and back-pressure.

Rule 19. Drains and soil-pipes through which water and sewage is used and carried shall be of cast-iron, when within a building, and to a distance of 5 ft. outside of the foundation walls thereof. They shall be securely ironed to walls, laid in trenches of uniform grade, or suspended to floor timbers by strong iron hangers. They shall have proper fall toward sewer.

Rule 20. When tile is used for the house-drain, exterior to 5 ft. from the foundation walls, it must be laid in a trench cut to uniform grade. The ends of the pipe must first be welded and space between hub and end of next section of pipe be completely filled with best quality of hydraulic cement. A scraper or wiper must be used after the cement is applied to each joint, and before the next section is laid to remove any cement that may have been forced into the pipe. Both ends of the house-drain must be left open for the inspector to roll a rubber ball through it, from the highest point.

Rule 21. Soil and waste-pipes shall be carried out through the roof, open and undiminished in size, to such

a height as may be directed by the inspector, but no soil or waste-pipe shall be carried to a height less than 1 ft. above the roof of building, dwelling or outhouse, except when they would open within 20 ft. of any door, window or air-shaft, in which case they must be attached to main or adjoining building, then carried above roof.

Rule 22. Handhole openings 4 in. in diameter shall be provided on all soil, waste or drain-pipes laid beneath the ground; said openings to be not less than 25 ft. apart, to be closed with brass ferrule and screw cap when of iron, and such openings to be required at each branch; or, if they do not project above the floor, manholes must be provided in order to give access to same.

Rule 23. Changes in direction shall be made with "Y" branches and "Y" branches and ⅛ or ⅙ bends. Offsets and 90-deg. fittings will not be allowed on any soil, drain or vent-pipe, except when unavoidable. Short "T-Y" branches will be permitted on vertical lines of soil or waste-pipe only, but may be used on horizontal lines of vent-pipes.

Rule 24. Every sewer connection shall have a fresh-air inlet not less than 4 in. internal diameter, entering the drain between the main trap and all house-connections. A back-pressure shall be placed in every sewer-connection on the sewer-side of main-trap.

Rule 25. Sewer, soil and waste-pipe ventilators shall not be constructed of sheet metal, earthenware or wrought-iron pipe, and chimney flues shall not be used as such ventilators.

Rule 26. Connections of lead-pipe with iron-pipe shall be made with brass or combination ferrules or brass soldering nipples properly soldered by wiped joint, and caulked or screwed to iron-pipe. Driven ferrules will not be allowed.

Rule 27. Joints between cast-iron pipes shall be packed with oakum or hemp, run with molten lead, properly caulked and made tight.

Rule 28. The arrangement of soil and waste-pipes shall be as direct as possible.

Rule 29. The size of soil and waste-pipes shall not be less than those given in the following table, and shall be of cast-iron or lead. Main and branch soil-pipes 4 in. in diameter. Kitchen-sinks, urinals, laundry and bath-tubs, 1½-in. in diameter; stop sinks, 2 in. in diameter. Lavatories and pantry sinks, 1¼ in. in diameter.

Rule 30. Every kitchen-sink connected with the city sewer system shall be provided with a grease interceptor, to be made of not less than 5 lb. sheet-lead, enameled iron, or brass with no less than 6 in. trap-screw on top, the size of said trap to be no less than 12 in. Except in hotels, boarding-houses, restaurants, in which the size of the grease interceptor shall be fixed by the inspector.

Rule 31. No steam, exhaust or blow-off pipe from any boiler will be allowed to connect with the house-drain; they should discharge into a tank or condenser, the waste from which should pass through a deep seal-trap then into sewer.

Rule 32. Safe, refrigerator-waste, or sediment-drain of any hot-water boiler shall not connect directly with any soil, waste or drain-pipe.

Traps and Vents.

Rule 33. Each fixture must have separate trap as near fixture as possible, and no trap shall be set more than 18 in. from any fixture, except lavatories with less than four bowls may waste one 4x8-in. lead drum-trap; this rule may be applied to wash-trays also.

Rule 34. All traps must be protected from siphonage and back-pressure by special vent-pipe if said trap is 18 in. or more from vertical waste-pipe.

Rule 35. The size of traps shall not be less than those given in the following table: Lavatories, pantry sinks and drinking fountains, 1¼ in.; urinals and laundry tubs, 1½ in.; slop-sinks, 2 in.; water-closets, 4 in.; bath-tubs shall have lead drum-traps, 4 in. in diameter and 8 in. deep.

Rule 36. All vent-pipes must be of lead, cast-iron jointed, as in rule No. 23, and each vent shall have a trap-screw wiped into it not more than 6 in. above connection with trap unless vent is connected with trap by brass-union, or connected into drum-trap. Trap-screws may be left off of water-closet vents.

Rule 37. All vent-connections to fixture-trap, except slop-sinks and water-closets, shall be made with lead pipe properly wiped to brass solder nipple, brass or combination ferrule screwed or caulked to iron pipe.

Rule 38. The traps of water-closets shall be vented by a 2-in. pipe taken out of the soil-pipe as near fixtures as possible, except as hereinafter provided. Where there is only one water-closet on a line of soil-pipe no vent is required, providing it is within 2 ft. of a 4-in. vertical stack. But where there are two water-closets located on the same floor and both are within 2 ft. of the stack either one of the closets must be vented. Where two or more closets discharge into the same vertical soil-pipe on different floors, a separate vent connection must be provided for the trap for the lower closets, which may connect with the soil-pipe above the upper water-closet.

Rule 39. Vent-pipes may be combined by branching together and increasing in size, and then carried into soil-pipe above the highest fixture, or continued above the roof.

The sizes of combined vent-pipes shall not be smaller than those given in the following tables:

One and a half-in. main vent will carry three 1¼-in. branches.

Two-in. main vent will carry two 2-in. and one 1¼-in. branches.

Three-in. main vent will carry five 2-in. and two 1½-in. branches.

Four-in. main vent will carry eight 2-in. and six 1½-in. branches.

Rule 40. All water-closets shall have flushing-rim bowls. Pipe wash-bowls, pan, plunger, long hopper or direct-supplies of any kind, or closets having an unventilated space or whose walls are not flushed at each discharge will not be allowed.

Rule 41. Enameled-iron hoppers shall be properly caulked with lead to cast-iron soil-pipe.

Water-Meters and Water-Pipes.

Rule 42. Every water-closet shall be provided with a separate stop-cock on supply-pipe above floor.

Rule 43. All water-meters shall be of a type adopted by the board of commissioners and shall always be set level. They shall be placed on main service-pipe, as close to the point where it enters the premises as possible and be provided with a waste-cock.

Rule 44. Red lead, white lead or asphaltum shall not be used in screwing joints in meter-connections.

Rule 45. All meters shall be carefully protected from frost or breakage.

Rule 46. All water-pipes, laid parallel with any curb, shall be no less than 3 ft. from curb and 18 in. deep when laid in street and 12 in. deep in yard.

Rule 47. Every water-meter shall be provided with a Tee-handle stop-cock, placed not more than 18 in. from alley fence or 18 in. from curb on walk-side of curb.

Rule 48. Air-chambers shall be provided on ends of all water-lines.

Rule 49. Whenever any application shall have been filed with any plumber authorized to receive same, for the purpose of making connection with the waterworks or sewerage system in the city of Galveston, it shall be the duty of such plumber to construct and complete such connection without unreasonable delay and with all possible speed. Any master or employing plumber who shall fail to make such connection within a reasonable time and all possible speed by reason of his own neglect or by reason of the request or desire of the party for whom such connection is to be made, or who shall withdraw the application made by him to do such work without permission of the board, shall forfeit his license to do any work in the city of Galveston for the period of one year, and such license shall be revoked by the board of commissioners of this city.

Sec. 2. Any person found guilty of violating any of the foregoing rules shall, upon conviction thereof, be fined in the sum of $10 and shall further be liable to the provisions of article 581 of the revised ordinances of the city of Galveston, unless a different punishment is fixed by the laws of the state of Texas, in which case the penalty here fixed shall not be applicable, but such person shall be prosecuted under the laws of the state of Texas and fined as thereby provided.

Sec. 3. That an ordinance entitled "An ordinance providing rules and regulations for the construction of house-connections with the water and sewer systems in the city of Galveston, Tex., and house plumbing in said city of Galveston," adopted by the board of commissioners of the city of Galveston on the first day of March, 1906, be and the same is hereby repealed.

Sec. 4. This ordinance shall take effect and be in force after due publication thereof as provided by the charter of the city of Galveston.

WHAT IS YOUR EXPERIENCE?

Editor "Domestic Engineering":—Would you kindly publish in your next issue the following question: Is it a good practice to lay ½-in. galvanized pipe in a bed of cement, three parts of sand and one part portland cement? The ground eats out the pipe in a couple of years. Would the cement have any action on the pipe towards making it better or worse? Hoping you will publish this in your valuable paper, I remain,

Des Moines, Ia. A Constant Reader.

BRONZING OR PAINTING THE SOIL-PIPE.

Editor "Domestic Engineering":—Can you tell me how I can fix the soil-pipes where they show, so that they will not turn all the colors of the rainbow when I paint or bronze them? If so I will be greatly obliged to you.

S. P. L.

If you will first paint the pipes over with one or two coats of white shellac, and after it dries use the bronze or paint, as the case may require, we believe that you will have no further trouble.

WHAT IS A SITZ BATH-TUB?

Editor "Domestic Engineering":—I have seen the term "Sitz-bath" used and I would like to ask its meaning.

J.

A sitz-tub is a special form of tub smaller than the ordinary. An average size might be mentioned as two feet long, 22-in. wide and anywhere from one foot to 17 inches high. They are very convenient for bathing children and for the purposes of seat baths.

WHAT ABOUT THE GAS-METERS WORKING OVERTIME.

Editor "Domestic Engineering":—I wonder if you can give me any information in regard to the idea that the gas-meters do not register correctly. It seems to be the general idea that they are made for the companies' good and I would like to know the right of the matter.

Meter.

We are aware that many people seem to think that they are being cheated every day by the gas men. However it has been our experience that, when their attention is called to the matter of the meter, they are glad to make a test or put on a different meter. These people have gas to sell, it is true, but you will find that the very last thing that they want is a lot of dissatisfied customers on their lines, who are always kicking. As a general thing it may be stated that meters that are within two per cent of being right are regarded as satisfactory. It may be of interest to you to know that meters generally run slow rather than fast and that the popular idea that they run only to the interest of the company is all wrong. Of course, in making this statement, we eliminate all leaks. Those are due to the oversight or carelessness of the workmen and should not be laid up against the company, unless they have a very slack inspector.

RUBBER OR LEAD FOR SMALL GASKETS?

Editor "Domestic Engineering":—Will you kindly tell me which you would prefer to use for the small gaskets for the smaller sizes of the unions on the steam and water jobs, and oblige, Inquiry.

Why use either? There have been on the market for some time, classes of unions that may be used without any gaskets at all. Why not wake up and come along with the times and be up to date!

YOU MIGHT ANSWER THE LAST PARAGRAPH.

Editor "Domestic Engineering":—I would like to see a couple of strong articles written on the folly of using a ¾-in. pipe as house-service when 1-in. and 1¼-in. would give much better results. For instance, one man used a ¾-in. line—the balance, like sheep, do likewise, even when they know they will not have sufficient supply to operate two fixtures at once.

Your "Business Management" department is profitable reading. Keep the good work up along these lines that the foolish may change their ways and the new beginner may get the proper start.

I would like you to describe and illustrate a steam-heating job, 1 or 2-pipe system in a two-story building, radiators on the second floor, and coils on the first floor. Coils are to be on ceiling and boiler on first floor level. There is to be no cellar nor pit.

Tucumcari, N. Mex. R. T. Stuart.

EFFECT OF WATER ON PIPES.

Editor "Domestic Engineering":—If you can conveniently do so, I wish that you would give me some idea of the action of water upon pipes, as I should like to know more about it than I now do.

S. S. C.

Some of the authorities upon the subject state that most of the waters have a solvent action upon the metals with which they are thrown in contact. This is true in particular of the soft waters. The waters corrode the pipes and the red oxide of iron is commonly called iron rust. It is stated that water will corrode lead, zinc and brass and form poisonous compounds. This solvent action of the water is said to increase with both heat and pressure. Sometimes the lead and zinc acquire a coating which prevents them from being corroded further. Now that is what the people in authority have to say upon the subject (the same being somewhat boiled down. We would like to ask if it has not been found necessary at various times and places to put a cast-iron return pipe on steam jobs because the wrought-iron

pipe would not stand the effect of the condensation returning through it?

The writer remembers a case where he had to pull out a line of returns that had been not over seven years in the ground.

WHAT AILS THIS BOILER?

Editor "Domestic Engineering":—I have a heating plant which will not work satisfactorily. We cannot get one pound of steam on the plant. I am enclosing a diagram (Fig. 1), which I hope will help you to understand the job.

The fire does not burn as it should. It lies dead, and takes from four to six hours to come up and then it does not burn right. Do you think the heater is too low down in the pit or is the flue not large enough?

When heater was set in the original place and had a 12x12-in. flue it would get up steam in 15 minutes. We have not yet put on any additional radiation. There is only 854 ft. of radiation besides the piping. I think the heater is large enough, but there is something wrong somewhere, which I would like to find out. You will see by the diagram that we have turned the heater around

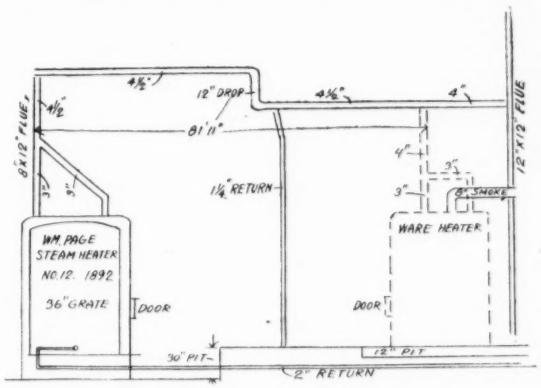


Fig. 1. What's Wrong Here?

and now have 4½-in. steam pipe. The pipes which originally went from heater went on a square angle. I changed to a 45-deg. The pipes have about 10-in. diam. outside of the offset from the heater to where the heater used to set.

If we could get fire and no steam, I should think that the fault was in the piping, but we can get neither. The flue runs to the ground about seven feet below where the smoke-pipe enters it.

Any information which you can give me, which will help us out will be gladly received by

Atlantic City, N. J. C.

The writer has not stated the size of the smoke-pipe on the second set-up of the boiler. However, I assume that he would not be so unwise as to make it any smaller. If he has, let him increase it at once to a size which will have a capacity at least 15 per cent greater than the combined area of the boiler tubes. However, if the smoke-pipe is the same size as the one that worked all right, don't meddle. The first thing I would do on this job would be to put a piece of tin or galvanized iron in the chimney directly across it just below the place where the smoke-pipe from the boiler enters the chimney. Then, before I connected the smoke-pipe again, I would test the draft of the chimney by putting some papers in the open flue and observe how it drew. If it goes all right, then connect the smoke-pipe and put some light stuff in the fire-box and see if the draft is all right. If not, I would go outside and look around and see if the chimney was different in height (less) from the first. I say this because he shows a different location of the chimney and I assume that it is a different one. The area in an 8-in. smoke-pipe is slightly over 50 in. The area in an 8x12-in. flue is 96 in. and so I believe that the chimney is large enough.

There is one more thing he can try, and that is to experiment with the sizes of coal. If he, after trying these matters out, is unable to make the boiler carry steam, I can see nothing for it but that the boiler will have to be raised to its former level. If I put it that high, I would raise it to the floor-level, if it were possible. I have tried to take the easiest way out of this, with the smallest amount of expense and make the various steps in a regular order.

CAULKING THE LEAD INTO THE HUB.

Editor "Domestic Engineering":—Will you tell me in an early issue of your most valuable paper if it is desirable, when caulking the joint in a cast-iron soil-pipe, to make two pourings and to caulk the joint twice? Q. E. D.

We do not regard this as a good practice. The lead does not unite. If you will take the trouble to pour a joint, caulk it, and then fill up the space left with a second pouring, which shall then be caulked and after this is done you smash the joint and examine the lead as it has been settled to place, you will find two distinct rings of lead around the pipe. Make the joint all at one pouring and caulk it properly.

The Best of the Bargain.

A conscientious Sunday school teacher had been endeavoring to impress upon her pupils the ultimate triumph of goodness over beauty. At the close of a story in which she flattered herself that this point had been well established, she turned confidently to a 10-year-old pupil and inquired: "And now, Alice, which would you rather be, beautiful or good?"

"Well," replied Alice after a moment's reflection, "I think I'd rather be beautiful—and repent."—Lippincott's.

The "Bo'n Oratah."

It is narrated that Colonel Breckinridge, meeting Majah Buffo'd on the streets of Lexington one day, asked: "What is the meaning, suh, of the conco'se befo' the co't house."

To which the Majah replied:

"General Buckneh, suh, is making a speech. General Buckneh, suh, is a bo'n oratah."

"What do you mean by a bo'n oratah?"

"If yo' or I, suh, were asked how much two and two make, we would reply 'foh.' When this is asked a bo'n oratah he replies, 'When in the co'se of human events it becomes necessary to take an integeh of the second denomination and add it, suh, to an integeh of the same denomination, the result, suh—and I have the science of mathematics to back me in my judgment—the result, suh, and I say it without feah of successful contradiction, suh—the result is fo'.' That's a bo'n oratah."—Lyceumite.

Vacuum Cleaning

What It Is and Does, and How It Should Be Installed.

That the induction of a rapid and powerful flow of air through a properly proportioned opening into a chamber otherwise airtight may be utilized to remove effectively all dust and dirt from the interiors of buildings and their contents is one of the most obvious though most useful conclusions of modern science. The commercial feasibility of exhausting the air from an airtight vessel (i.e. creating a vacuum in it) has long been known and used to some extent. The tendency of the surrounding air to get back into the vacuum exerts the energy utilized in vacuum-cleaning.

The elements of a vacuum-cleaning system are: A vacuum-producer or pump with the power to drive it (steam, electricity, gasoline or hand power); the airtight chamber (generally a cylinder or long pipe) into which the dust is drawn and in which the vacuum is produced; and the necessary flexible cleaning tools to permit of the most effective use of the energy created.

From the simplicity of its elements it will be inferred that the rapid adoption and development of vacuum-cleaning depend upon a general realization of its sanitary and economic value and upon the facility of its application, due to the extensive use, in one form or another, of motive power in buildings.

All over the world people have, during the past decade or two, been aroused by medical science to the fact that they have been living and working, from time immemorial, in the midst of a quantity of filth injurious to health and which has defied the most vigorous application of broom, duster and sweeper to dislodge it. Now that escape from such unsanitary conditions is simple by vacuum-cleaning, the wide interest in the subject is not surprising. When attention is called, for example, to the fact, ascertained from government statistics, that tuberculosis and pneumonia, the two most deadly and prevalent diseases, are almost entirely dust-conveyed and, therefore, preventable to a large extent by the removal (not the stirring up) of the disease-bearing dust germs from our habitations, the sanitary advantage of vacuum-cleaning becomes tangible. In the year 1906 alone, dust, by infecting with consumption and pneumonia, killed 283,230 persons as against 104,210 who died as a result of all other epidemic diseases. In fact, the accumulated experience of years and new knowledge of infection by germs and bacteria have taught that the old-fashioned methods of sweeping and dusting have been the cause of more fatalities among human beings than a number of other agencies combined, not excepting wars, pestilences and dramatically contagious diseases, known to mankind since history began. While the bacteriologist has been working in his laboratory to discover means that will render harmless the germs and bacteria found in dust that cause infectious diseases, human ingenuity found no effective mechanical way of lessening the work of the house-cleaner and the danger from infection until within a comparatively few years ago, when suction or vacuum-cleaning became a fact.

Another advantage of the thorough air-scouring by the vacuum process is the considerable saving in wear over other methods in cleaning fabrics and decorations. For instance, a carpet which had been cleaned by a professional carpet-cleaning establishment was found, on being tested for dirt by the tool of a mechanically driven vacuum plant, to yield so much dust and grit that the first cleaning seemed very superficial. In another instance two rugs were tested for wear by cleaning, over a period of about one year, one being cleaned by vacuum, the other with a carpet sweeper. At the end of the period, the one to which the carpet sweeper had been applied showed visible wear, the evidence being found in the nap which was torn off at each sweeping—while the other showed no signs of wear and was perfectly clean, proving conclusively that the method of cleaning had considerably prolonged its life.

Vacuum-cleaning is not an experiment; it is a firm step in the direction of civilization. The perfection and standardizing of the apparatus employed will soon place it in a class with sanitary plumbing as a necessity to health and required by the building regulations of every progressive community.

The Apparatus, Its Installation and Requirements for Highest Efficiency.

As in any industry the product of which meets a universal need, there has been keen competition among a number of individuals and companies to obtain a monopoly of the vacuum-cleaning field. This competition has taken the form of numerous patents in the details of cleaning devices, from the small hand-power carpet cleaner with its suction fan, costing but a few dollars, to the built-in system operated by steam, gasoline or electricity for the largest buildings and costing thousands of dollars. In the course of evolving a satisfactory portable apparatus or an installed system, there has been a gradual elimination of the number of competitors, so that, to-day the apparatus has been fairly standardized, thus insuring more economical production and resulting in the selling out of vital patents embodying details that did not permit of the formation of entirely satisfactory apparatus without infringement.

The vital parts of the machinery which have received the chief attention of the inventor are the vacuum-producer, pump or fan; special machinery for supplying the driving force; devices for economizing the vacuum when the full capacity of the system is not required; devices for separating the air from the solid matter; devices for disposing of the solid matter in a sanitary manner; and the scientific construction of the cleaning tools for the highest efficiency under a diversity of conditions.

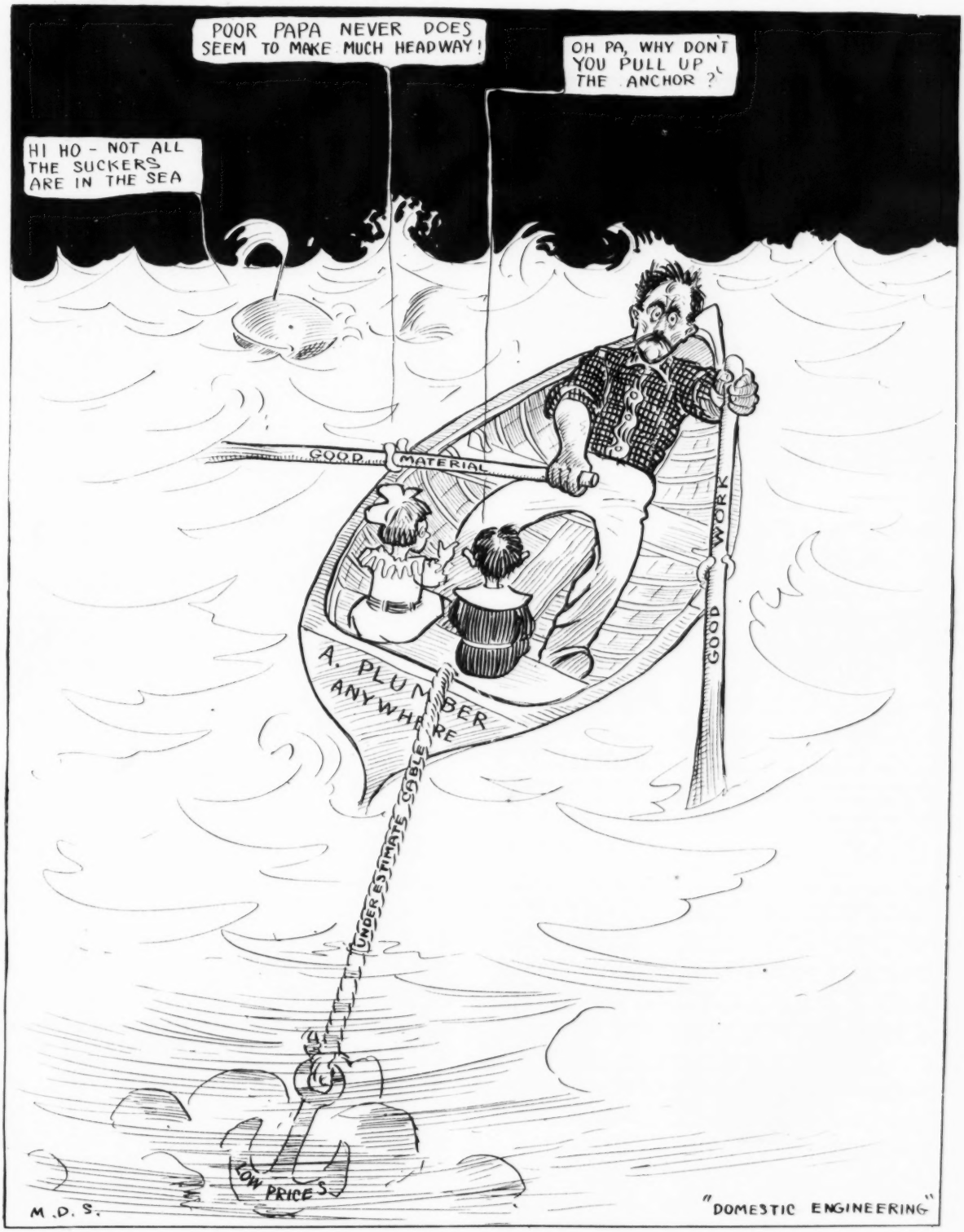
A number of patents have been granted on each of these parts and on other devices of a special nature. The makers of the apparatus have not, however, ceased experimenting for still greater perfection and plumbers, engineers and other experts particularly interested in vacuum-cleaning will, no doubt, be able to find much that is new on a visit to places where the apparatus may be seen and tested.

It is with the stationary installation that the plumber and steam-fitter need technically to be concerned. When the subject of vacuum-cleaning comes up with a client he must be the judge as to what kind of a system it is best to install and what requirements as to capacity, efficiency, cost of installation and operation it must meet. It is not intended by the foregoing outline or by the general specifications to follow to give him anything more than the starting point for an investigation of the subject.

(To be continued.)

*Reprinted by courtesy of "The American Architect."

"Domestic Engineering" Cartoon on "The Dangers of Underestimating" No. IV.


POOR PAPA NEVER DOES SEEM TO MAKE MUCH HEADWAY!
OH PA, WHY DONT YOU PULL UP THE ANCHOR?
HI HO - NOT ALL THE SUCKERS ARE IN THE SEA
GOOD MATERIAL
GOOD WORK
A. PLUMBER ANYWHERE
UNDERESTIMATES
LOW PRICES
M.D.S.
"DOMESTIC ENGINEERING"

His oars are all right. He's pulling with his might. But, oh! that Anchor!

We are receiving requests from readers for reprints of these carto ons for framing. We will forward extra copies to subscribers to "Domestic Engineering" upon request.

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NOTICE TO ADVERTISERS.

Copy and cuts for advertisements intended for a particular issue should reach the office of Domestic Engineering on Monday of the previous week if it is desired that a proof of the advertisement shall be submitted. New advertisements can be received up to noon of Monday of the week of issue, but no proof can be shown.

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Member of the Federation of the Trade Press Associations of the United States.

SPECIAL NOTICE TO READERS.

Our readers are invited to send in articles on any topics covering sanitary interests as outlined above. Photographs and drawings with descriptions of special interest to plumbers and steam-fitters are welcomed. "Domestic Engineering" pays at space rates for all articles, notes, criticisms and news data so contributed.

Among the Wholesalers

WILL MAKE WATER-METERS.

Somerville Mfg. Co., 32 Clifton St., Somerville, Mass., will manufacture a water-meter, invented by Elmer S. Stack of that city. The officers of the company are: President, Frank L. Tibbetts; treasurer, E. S. Stack; secretary, Wm. P. French; sales-manager, Elkana N. Hook.

WILL MANUFACTURE HEATING GOODS.

The Stearns & Waterman Co., Boston, Mass., has been incorporated with a capital of $50,000 to manufacture heating goods. The officers of the new company are: President, Fernando L. Waterman, Woburn, Mass.; treasurer, Edward T. Willis, Boston; secretary, Arthur P. Teele, Waltham, Mass.

WILL MANUFACTURE HEAT REGULATORS.

The Crandon Mfg. Co., Inc., has just started in business at Bellows Falls, Vt., manufacturing electric heat-regulators. Those interested in the new enterprise are J. B. Crandon, Jay H. Brink and Ralsey C. Bidwell. The heat regulator which the new company will manufacture is the invention of J. B. Crandon.

ADMINISTRATION CHANGES IN THE E. STEBBINS MFG. CO.

Several administrative changes have been made in the E. Stebbins Mfg. Co., manufacturers of plumbers' brass goods at Springfield, Mass. C. H. Downs, of New Haven, Conn., has been elected successor to A. H. Warner as treasurer and John Bischer, Jr., also of New Haven, succeeds A. H. Warner, Jr., as clerk. Elie Millett, who has been connected with the Millett Company of Springfield for several years, and Edmund Millett of New Haven have also accepted responsible positions with the concern. The company has increased its factory force.

MEETING OF NATIONAL ASSOCIATION OF BRASS MANUFACTURERS.

The National Association of Brass Manufacturers held a very successful meeting at the Hotel Pfister in Milwaukee on Wednesday, September 14th, at which time a number of new members were taken in; the question of the adjustment and equalization of freight rates came up for consideration, and a committee was appointed to investigate and report results of the best methods of modern foundry equipment and the most satisfactory way of melting metals. The matter of costs was extensively gone into and a committee appointed to take this question up in detail. There was a committee appointed for the standardization of sizes, threads and openings in lavatories and the several committees are to report at the next meeting, which will be the association's annual meeting and will be held in New York City, December 14, 1910.

H. R. BOYNTON, PRESIDENT OF THE H. R. BOYNTON CO., OF LOS ANGELES, CAL., IS DEAD.

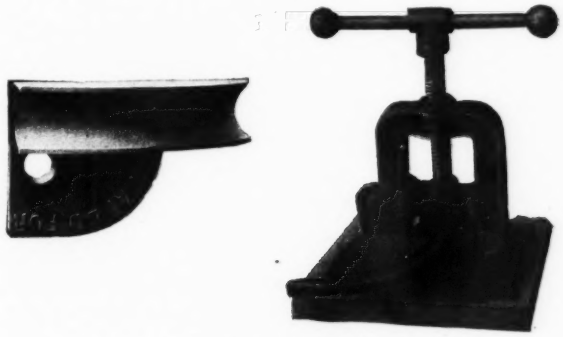
Horace R. Boynton, president of the H. R. Boynton Co., jobbers of plumbing and heating supplies, 214-216 North Los Angeles St., Los Angeles, Cal., died at the California hospital in that city on Monday afternoon, September 12th, while undergoing an operation. The immediate cause of Mr. Boynton's death was blood-poisoning, due to an affection of the teeth, from which he had suffered for a long time. Three years ago Mr. Boynton had several teeth pulled and the wounds never healed properly. He suffered continual discomfort, though his condition was not considered dangerous until Saturday, September 3rd, when he began to complain of excruciating pains. Despite his suffering he went daily to his office until four days before his death, when he was forced to give up work and go to the hospital. On Monday an

operation was decided upon, but the ailment had been allowed to run so long that surgical skill could not check it, and the end came while he was on the operating table. Mr. Boynton was born at Waverly, Ill., in 1854. At an early age he went into the banking business and before he was 21 years old he became cashier of the County Bank of Waverly, a position which he held until he moved to Indianapolis. Twenty years ago he went to California, locating in San Francisco as Pacific coast agent of the Western Tube Company. He remained there until 1898, when he moved to Los Angeles and became manager of the old J. D. Hooker Company. Three years ago he organized the H. R. Boynton Company and opened one of the largest plumbing and heating-supply houses in Los Angeles. He was president of the company and took an active part in the management of its affairs. From the time he came to Los Angeles he took a lively interest in public affairs and he was prominently connected with all movements looking toward the betterment of the city. His widow, three sons and three daughters survive him.

TO BEND BUT NOT TO BREAK.

The bending of pipe neatly and accurately without breaking it has often been the problem encountered by many a plumber and gas-fitter. To perform this bending on the job is still more desirable. To do both is the mission of the portable and inexpensive pipe-bender, known as the "Star" pipe-bender, recently placed on the market by R. C. Bierdemann & Co., 4740 N. Ashland Ave., Chicago.

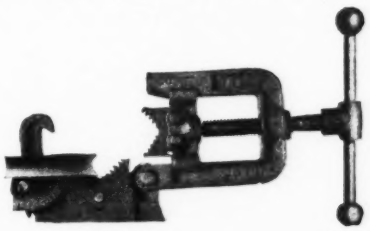
A glance at the accompanying illustrations will show



The "Star" Pipe-Bender Detached and Attached.

its adaptability to the worker's requirements. For this bender there are claimed the following points of merit:

There are no parts to get out of order. It is indestructible. It is simple to operate. It can be quickly applied or removed. It will not injure the vise or split the pipe. It is not a machine by itself; it is an attach-



Another View of the "Star" Pipe-Bender Attached.

ment which can be successfully and quickly applied to the vise of the operator.

The "Star" bender will fit the Crane No. 1 pipe-vise and is also made for a Crane No. 2 and a Reed No. 21. It will bend pipe up to 1 inch without kinking or splitting it, and will make a perfect bend in half the time it takes to make a poor bend without it. As all the bends are uniform it adds symmetry to the job. The economy in time will save the cost of the apparatus on any job of reasonable size. The bender is compact and can easily be carried in a workman's tool bag. Quotations can be obtained from R. C. Bierdemann & Co.

AN INTERESTING SHOWER-ATTACHMENT.

Among the opportunities of the plumber today in strengthening his hold on public attention and esteem is that of stocking and exhibiting the attachments of a well-equipped bath-room, lavatory and kitchen. Why leave the sale of these to the hardware-man? What would you think of a dry-goods store that sold brass beds, mattresses

The "Sandham" Shower-Attachment.

and pillows, but was unable to supply sheets, blankets and pillow-cases?

The delights of a shower are well known to the habitual bather and the bath-rooms of the rich are in every case provided with a complete shower-equipment. To place a shower within the reach of all is the mission of R. R. Sandham, Harlan, Ia., by means of the shower-attachment herewith illustrated. The photograph displays the attachment in actual position in a city bath-room. It is connected to the bath-faucet in a second and by adjustment a shower of any temperature can be attained. The attachment consists of a semi-rigid frame of nickel-plated seamless brass pipe to which the water is conveyed by a durable reinforced rubber tube and with an aluminum faucet connection. The pipes terminate in nickel-plated spun-brass spray-roses, located opposite the bather's body when sitting in the tub. One hundred and fifty streams of water compose the shower. When not in use, the apparatus hangs flat against the wall at the back of the tub, suspended from two nickel-plated hooks. Further particulars can be obtained from R. R. Sandham, Harlan, Ia.

"UNIQUE" VALVES.

How to tap radiators at one end only; how to dispense with two-end connections; how to dispense with the bringing back of return-pipes under the radiators to the risers. All these things are detailed in the new illustrated folder issued by the Honeywell Heating Specialty Co., Wabash, Ind. The illustrations of the working parts of the "Unique" valve are certainly unique in their presentment, as are also the 11 photographs of the different applications of the Honeywell radiator-valve. Write for one to complete your files and mention "Domestic Engineering," the unique trade journal for plumbers and steam-fitters.

WRITE "WRIGHT" FOR RIGHT "WRIGHT" CATALOG.

The Wright Manufacturing Co., Detroit, Mich., is distributing its catalog No. 12, which illustrates and describes the company's steam-specialties. A combined filter, dirt and scale-separator is an interesting feature, as is also the "Wright" air-trap for removing air from water under pressure. Low-pressure steam-traps and water-columns are also presented in an interesting manner. A copy of the catalog can be obtained upon request.

WHILE THERE'S LIFE THERE'S SOAP.

The Cockney says "While ther's life ther's 'ope." The Watrous folks have made it read "While there's life there's soap." And why not? The cake of soap is clumsy and elusive. You lay it on the side of the wash-bowl in your haste and it plunges down madly and tries to pull up the plug. For this reason and for many others, the Watrous liquid-soap fixture ought to commend itself to the Great Unwashed Public with cleansing desires. The

The Watrous Liquid-Soap Fixture in Operation.

up-to-date plumber can utilize this fixture in his window-display to attract the buying attention of the house-wives who desire the best. The man in the house, too, who has been chased to the drug-store for a cake of Colgate's because company had come and was going to stay all night, will bless the liquid-soap fixture. It is more cleanly, more economical in use and banishes the horror of woman—"a shiny nose." It is made in various sizes and styles for varying purposes—the house, the office and the factory. All these are illustrated and described in a neat booklet, mailed upon request, and issued by the manufacturers—The Watrous Co., Fisher Building, Chicago.

PERSONAL MENTION.

H. Ewinger, president of the H. Ewinger Plumbing & Heating Co., Burlington, Ia., was in Chicago this week, buying material for the plumbing and heating job in a large seven-story hotel in his city, a contract which he recently secured. He reported business brisk in the plumbing and heating line in Burlington.

Robert Dalziel, one of California's pioneers, and the founder of the plumbing supply house in San Francisco bearing his name, surprised his many friends there last week by announcing that he had taken unto himself a wife. The wedding took place at Oakland and was a quiet affair, only kinsmen and close friends being present. The groom and the bride spend their honeymoon abroad, both being natives of Scotland.

Joseph Netzer, of Laredo, Tex., president of the Associated Master Plumbers of Texas, and one of the most successful plumbing contractors in that state, has been touring the central states the last month accompanied by his wife. They attended the Red Men's convention at Toledo, O., and had a most enjoyable time there. They reached Chicago last Sunday and spent the early part of the week here. Mr. Netzer has been in business at Laredo for 21 years and he is an enthusiastic Texan. He has grown up with Laredo, which is a thriving city with something like 18,000 inhabitants. It has promise of a great future on account of the discovery of a plentiful supply of natural gas near the city, as well as by ample irrigation of the surrounding country. Natural gas and irrigation are good things for the plumbing trade anyway. Mr. Netzer reported business good in his part of the country and told "Domestic Engineering" that his State Association of Master Plumbers has commenced preparations for the Galveston convention of the National Association of Master Plumbers which, he anticipates, will be a huge success.

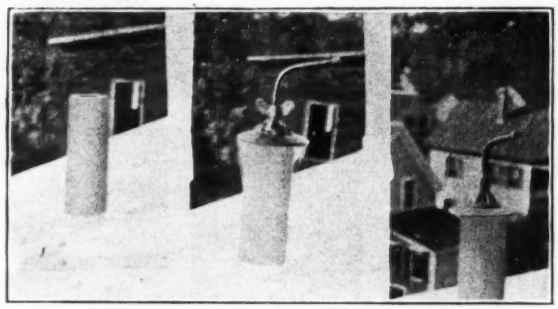
TRADE LITERATURE RECEIVED THIS WEEK.

The Barnes Manufacturing Company, Mansfield, O., manufactures iron and brass pumps for hand, wind-mill and power uses. The company's new catalog of its products contains 240 pages and illustrates and describes these most fully. It is an interesting volume and is well worth writing for. Mention "Domestic Engineering" when you apply for it.

The Day-Ward Co., Warren, O., is advertising its many sanitary products by means of its catalog "E." The company manufactures cast-iron porcelain-enameled sanitary ware. It contains 184 pages and illustrates and describes every type of fixture manufactured by the company. Many of these illustrations can be studied to advantage by the practical plumber, revealing as they do possibilities for installations on special jobs and opportunities for attractive window display. A copy of the catalog can be obtained upon request by mentioning "Domestic Engineering."

A STOCK AND TIME-SAVING TESTING PLUG.

The illustration shows a stock and time-saving testing plug, recently placed on the market by J. H. Brown, Keene, N. H. The advantages claimed for it are: A saving of single hubs, double hubs, old lead, oakum, gasoline and labor; expensive roof collars are displaced by using a galvanized or copper straight sleeve, the saving of a



After Test. Testing. Before Test.

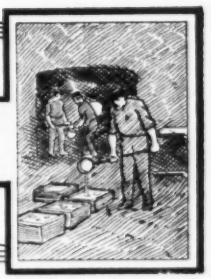
man's time lost in carrying pipe up a ladder and dropping it down through the roof collar.

In use, the plug is inserted inside of the pipe, where it passes through the roof, a screw being turned to compress the rubber as in a regular testing plug. When the water flows out of the pipe, it passes through holes in the plug and runs away over the shield, and not into the building. A neat folder is sent out by J. H. Brown, Keene, N. H., which further illustrates and describes the device. Readers of "Domestic Engineering" can obtain it upon request.

W. E. McCorquodale, Orange, Tex., has been awarded the contract for plumbing the new Stark building in that city.

M. Boylan & Co., Virginia, Minn., have secured the contract for the construction of a central-station heating plant for the Virginia Electric Power & Water Co. in that city. A number of office buildings and residences will be heated by steam from this plant when it is completed.

THE METAL MARKET



PIG-IRON QUIET.

Among the features of the trade are inquiries in the market for delivery during the early part of 1911. A manufacturer of heating supplies is in the market for 40,000 to 50,000 tons of foundry iron for 1911 delivery. Several other interests have put out inquiries for next year's shipments, but are seemingly unwilling to pay more than current quotations for this iron. Pig-iron manufacturers believe that they should get something better than prevailing prices and in consequence there is no business. Some Northern iron has been sold during the week in the New York market at regular quotations, and it is probably true that the inquiries received this week have been somewhat larger than the production; still these have not been turned into orders. Southern manufacturers are asking $11.50 for No. 2 iron, but some especially well-known brands have been sold for next year's delivery at $12. Some stove-manufacturers are in the market for approximately 2,000 tons of iron and a pipe-manufacturer on the Delaware River has purchased. The leading soil-pipe interests have also definitely closed for 7,500 tons. Stocks, however, are fairly large. Prices continue without change as follows:

No. 1 Northern foundry, New York	$16.00 to $16.25
No. 2X Northern foundry, New York	15.25 to 15.75
No. 2 Plain Northern foundry, New York	15.25 to 15.50
No. 2 Southern foundry, Birmingham	11.50 to 12.00
No. 2 Northern foundry, Chicago	16.50 to 17.00

LEAD.

The demand for lead is fairly satisfactory, the leading interest maintaining its old quotation of 4.40 cents, and independent sellers asking 4.45 cents. The St. Louis market is unchanged at 4.30 cents.

SPELTER.

This metal appears to be scarce in New York. There is no doubt that the producers are restricting production. No effort is made to urge sales and in fact they are discouraged. The scarcity has resulted in buyers looking more closely into the market and some have placed contracts for forward delivery, and others have paid higher prices for nearby shipments. Spot-spelter in New York is quoted at 5.50 cents and in St. Louis at 5.35 cents.

COPPER.

The inquiries in the market this week are not large and the copper business has been very quiet. There is probably a falling off in consumption. If the truth be known, many business interests here in the East are disgusted with the situation. Crops are large and there seems to be no sane reason why business should not be satisfactory. Still there is the universal complaint about restricted operations in all lines of trade. Some of the largest manufacturers, who operate rather as individuals than corporations, are willing to close down and see if a period of rest and recuperation will not change the temper of their workmen, and perhaps make a way for a steadier business. Concerns that are not making money, and there are many of them, are not disposed to pile up stock on high labor-cost and it would not be at all surprising if many of the mills using copper in one form or another would close down much after the fashion of the cotton-mills. Prices are unchanged from last week at 12.62½ cents for electrolytic and 12.87½ cents for Lake. There seems to be little or no interest in quotations.

PIG-TIN.

The prices of tin have declined. One of the leading operators in the London market is freely selling spot-tin in New York and in fact is urging sales. The London market has declined from day to day and tin is now quoted at 34.80 cents.

OLD IRON.

The demand is better, heavy melting steel scrap being in active requisition and $12.50 per ton has been refused. About 700 tons of mixed scrap from Panama was sold in New York at $10.55 per gross ton. Quotations for delivery in New York and vicinity are as follows:

Heavy melting-steel scrap	$11.50 to $12.00
No. 1 yard wrought long	12.75 to 13.25
No. 1 yard wrought short	11.75 to 12.25
Heavy machinery cast	12.50 to 13.00
Light iron	5.00 to 5.50
Cast borings	6.50 to 7.00
Wrought turnings	6.50 to 7.00
Pipes and tubes	11.00 to 11.50
Stove plate	9.50 to 10.00

NEWS FROM OHIO.

The village of Marble Cliff, O., located northwest of Columbus, has started work on its sewage-disposal plant under plans approved by the state board of health. This will remove the last pollution of the Scioto river, from which source the city of Columbus secures its water supply. The enterprising village began the work on its own volition, but when it was necessary to issue $19,000 bonds the plans were approved by the state board of health. The spread of the city of Columbus along the Scioto river had been viewed with alarm by a number of the residents of the city and especially medical authorities. When the plant is completed it will consist of three basins 30 by 80 ft., each with a seven-foot concrete wall, located west of the village. It is expected to have the work completed by November 1.

The Atlas Engineering Co., Cleveland, O., has been incorporated with an authorized capital of $15,000 to do a general engineering business. The incorporators were Gustave Bradenberg, John P. Mystrom, John E. Nygreen, William Beckman and August Larson.

Plumbing conditions in Columbus, O., will be severely criticised by the next bulletin of the Columbus board of health. The bulletin will say that, owing to the small number of inspectors, plumbing is not closely inspected and there is much bad and inefficient work done. It will advocate also a system of examination for plumbers and will declare that under present conditions anybody with enough money to buy a license can engage in plumbing work. This condition will be cited as the cause of bad plumbing work and the bulletin will demand a bettering of conditions. The two present plumbing inspectors who work under the city building inspectors will not be criticised in any manner, but the health department will insist that they need help. A board of examiners for plumbers was established by council several months ago, but were enjoined in the courts at the instance of conflicting interests.

The city council of Akron, O., has appropriated $4,000 for the purchase of a site upon which will be erected a sewage-disposal plant. The location will be about two miles north of Akron. Another ordinance has been introduced in the city council for the appropriation of $10,000 with which to erect the plant.

PACIFIC COAST LETTER

Building operations in San Francisco were sadly interfered with last week by the festivities that were under way and during the last three days of the week practically nothing was done in the plumbing line.

California's native sons and daughters have been celebrating the sixtieth anniversary of the admission of California as a state into the union, the state celebration centering here. Great crowds have been visiting the city, the streets have been decked in holiday attire and a general holiday has been observed. Among the great throng of people attracted here have been several plumbers from outside points and following the close of the celebration these have been visiting the local supply-houses and some good orders have resulted. This celebration, together with two national conventions and two big industrial expositions that are being held here this month, serve to advertise to the world at large the fact that San Francisco is in a position to again care for great crowds and that her merchants are able to handle even more business than before the fire.

During the past week a special session of the state legislature has been held at Sacramento for the purpose of making arrangements for enlisting state aid to the extent of $5,000,000 for the proposed Panama-Pacific International Exposition in San Francisco in 1915. Arrangements were also made, allowing the City of San Francisco to set aside a similar amount for this purpose. These two measures will be voted upon at the November elections but there is no doubt but that they will carry by a great majority, as the state, and the entire coast for that matter, is strongly in favor of the exposition being held here. With $10,600,000 from the state and city in addition to the $7,500,000 that has been secured by private subscription, it is believed that the fair is an assured fact for this city. The local plumbing trade has been very active in assisting in the preliminary work and in addition to heavy individual subscriptions to the fund by prominent master plumbers the local master plumbers' association has purchased stock to the extent of $5,000.

W. C. Chamberlin, the new coast representative of the Standard Sanitary Manufacturing Co., has recently returned from his initial trip to Los Angeles and vicinity in the interests of his concern and is now preparing to make a trip through the Northwest that will last for several weeks. This company has established coast headquarters in San Francisco and a resident representative will look out for its business interests in place of a traveling man from the factory, as has been the case in the past. Mr. Chamberlin is a new man on the coast but is well known in the trade in New England, from which territory he came to take charge here. He will spend considerable of his time in the near future in traveling and in getting acquainted with the "Standard" customers. The advantage of having a branch office on the coast will be generally appreciated by wholesalers doing business with this concern. While in Southern California, Mr. Chamberlin visited some of the famous resorts, including Catalina Island, and he is greatly pleased with California in general.

The George H. Tay Co. is preparing to commence a very active fall-campaign and Edw. H. Kinney, of this concern, states that the new catalog will shortly be ready for distribution and that it will be a model of its kind. This firm does considerable in the advertising line and always has something interesting to place in the hands of the plumber to remind him of the firm. At present some very attractive blotters are being distributed, these being of such a distinctive character that they at once attract attention.

The Milwaukee plan of credits, which has been discussed at great length here, and which promised for a time to be adopted, has never been placed into effect and the probabilities are that it will not, as the matter is no longer receiving attention.

The Board of Public Works has just awarded to Foster & Vogt a contract for hauling and laying the pipe for that district of the auxiliary water-supply system bounded by Powell and Market streets and Van Ness Ave. This work is to cost $102,809. The local labor-unions interested in the matter are urging the American Federation of Labor to make an early decision in regard to the jurisdiction over the calking of this pipe. The work is claimed by both the water-workers and the journeymen plumbers and now that active construction work on the system has commenced it is desired that a decision be rendered at once. In the meantime the work is being done by the water workers.

The Wittman & Lyman Co. has commenced work on the installation of the heating systems in the administration and receiving buildings of the new City Hospital and has just received the first payment for work performed.

The Selby Smelting & Lead Co. has been awarded a contract for furnishing to the City of San Francisco 45 tons of lead for calking the mains of the new auxiliary water-supply system. The price agreed upon is $92.20 per ton.

James O'Halleron, a plumber of San Francisco, and Miss Belle Julian Kivett, of Santa Rosa, appeared at Petaluma, Cal. a short time ago to be married. The minister noted that the license had been secured in Marin County and informed the couple that the ceremony must be performed in the county in which it was issued. Accordingly, an automobile was secured and the party journeyed across the county line, where, after nightfall, the ceremony was performed.

Frank Stock, a plumber of San Jose, Cal., was here recently on a short visit.

Coast business men were shocked this week to learn of the sudden death of H. R. Boynton, of Los Angeles, president of the H. R. Boynton Co., a leading supply-house of the Southern city. For many years Mr. Boynton was in business in San Francisco and is well known in the local trade. In 1898 he moved to Los Angeles and three years ago organized the company which bears his name. Mr. Boynton became a member of the California Club soon after arriving at the Southern city and at the time of his death was its president. Death resulted from blood-poisoning, an operation being performed at the time. He leaves a widow and six children, three daughters and three sons.

MANY JOIN COLORADO MASTER PLUMBERS' ASSOCIATION.

P. A. Steffian and W. E. Cecil, of Tucumcari, N. M., have joined the Colorado Master Plumbers' Association.

A. H. Palmer, Hamp Bros., H. Wadman and S. Richards, engaged in the plumbing business at Logan, Utah, have organized a local association and have affiliated themselves with the Colorado Master Plumbers' Association.

R. B. Bushaw has opened up a plumbing establishment at Riverton, Wyo., and taken out membership in the Colorado Master Plumbers' Association. He desires catalogs and price lists from manufacturers and jobbers of plumbing goods.

Through the efforts of the Salt Lake Master Plumbers' Association and of President Henry Green a local association has been organized at Ogden, Utah, and has affiliated itself with the Colorado Master Plumbers' Association. The members are A. W. Meek, W. J. Dallimore, James Macbeth, John Smeding and Halverson Bros.

Defined.

The teacher was giving a geography lesson, and the class, having traveled from London to Labrador, and from Thessaly to Timbuctoo, was thoroughly worn out.

"And now," said the teacher, "we come to Germany, that important country governed by the kaiser. Tommy Jones, what is a kaiser?"

"Please, 'm," yawned Tommy Jones, "a stream o' hot water springin' up an' disturbin' the earth!"—Argonaut.

NEW ENGLAND NEWS.

W. G. Gagne, Skowhegan, Me., will open a plumbing and heating store on Water street in that city this month.

At a special meeting of the selectmen of Huntington, Mass., the heating contract for the Murrayfield school was awarded to Mosely & Maschin, Westfield, Mass., for $1,600.

The Plymouth, N. H., state normal school trustees are soon to ask for estimates for installing a new heating plant for which the last session of the legislature appropriated $10,000.

Articles of incorporation have been filed with the secretary of state at Montepher, Vt., by the Pillsbury & Baldwin Co., of St. Johnsbury, Vt., with an authorized capitalization of $100,000. The company proposes to manufacture plumbing specialties. The incorporators are Frank D. Thompson and Fred H. Pillsbury of Barton, Vt., and Charles W. Steele, John Rickaby and Joseph Fairbanks, of St. Johnsbury, Vt.

An interesting baseball game between the Salem, Mass., and Boston, Mass., master plumbers is being arranged for an early date.

Ruppert & Richter, Holyoke, Mass., have been awarded contracts for plumbing two two-family houses on Westfield road for L. T. Trowbridge.

The Chicopee school board has voted to install a new heating plant in the Willimansett school.

The selectmen of Marion, Mass., have voted to install a new heating plant in the central school at a cost not to exceed $1,000.

George Toppan & Co., Fairfield, Me., have the contract for installing the new plumbing in the opera house.

A. H. Moulton, Portland, Me., has the contract for installing a heating plant in the Ireson leather factory at Gorham, Me.

The Maine Master Plumbers' Association held a banquet in the Bangor House, Sept. 5. The banquet was tendered by the local body to the state association and was followed by a discussion of business and trade conditions.

The contract for plumbing the handsome residence being erected for Robert G. Whitney at Brooklawn, Conn., has been awarded to the W. P. Kirk Co., Bridgeport, Conn.

L. H. Mills, Bridgeport, Conn., has the contract for installing the plumbing and heating in the new office building of the United Illuminating Company at the junction of Broad and Cannon streets.

Carlson & Benson, Bridgeport, Conn., are to do the plumbing in the series of houses being erected by Richard Lombard on Hanover street in that city.

Walter T. Bell, of Woodbury, Conn., candidate for the office of first selectman of that town, was the organizer of the Master Plumbers' Association of the state and was appointed a member of the examining board for plumbers in New Rochelle in 1899, where he formerly resided.

The city of Boston, Mass., has awarded the following contracts: For installing a heating and ventilating system in Curtis Hall, to James P. Dwyer for $22,277; for installing plumbing in the same building, Michael Ahern for $6,237. Other bids for the work were: Heating, Ingalls & Kendricken, $22,590; C. H. Sanborn, $22,714; Alexander Duncan Co., $22,647; F. W. Zemier & Co., $22,775; Lynch & Woodward, $22,786; Pierce & Cox, $23,293; W. H. Gallison Co., $24,825; Buerkel & Co., $25,576; Chase & Baker, $25,720; J. J. Hurley & Co., $33,980. For plumbing: W. H. Mitchell & Sons Co., $6,595; Edward C. Kelly, $7,825; C. A. Bray Co., $8,035; Buerkel & Co., $8,461; W. N. McKenna Co., $8,758.

AMONG THE PLUMBING INSPECTORS.

Fred C. Finn has been appointed plumbing inspector to succeed R. S. Watson at Bay City, Mich. Before assuming his new duties Mr. Finn has sold his plumbing business in that city to his son.

William H. Lippert, a former sanitary inspector, has commenced mandamus proceedings against the city of Philadelphia for reinstatement. The suit is a peculiar one. Mr. Lippert was "dismissed" because the city said it had no funds with which to pay his salary. He says the city had funds, also that he was never given a written order dismissing him, according to law.

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Classified Advertisements

Advertisements under this heading 4 cents per word per issue, address included. Remittance to be made with order. To insure insertion copy should be received not later than Wednesday morning.

Situations Wanted

SUPERINTENDENT AND ESTIMATOR with 5 years of experience would like to correspond with heating and plumbing firms in need of such a man. Address No. 409, "Domestic Engineering," Chicago.

WANTED—WORK WITH A HEATING engineer or contractor by young man, age 21, technical graduate, can lay out and prepare plans, estimates, etc. Address No. 424, "Domestic Engineering," Chicago.

FIRST-CLASS AUDITOR SEEKS POSITION evenings checking up accounts or invoices; is an expert in plumbing line and familiar with new enamel-ware prices. Address No. 394, "Domestic Engineering," Chicago.

WANTED—POSITION BY YOUNG MAN who speaks both English and German fluently as bookkeeper and general office man with a plumbing or heating firm. Have had several years' experience in these lines. Address No. 415, "Domestic Engineering," Chicago, Ill.

A MAN THOROUGHLY FAMILIAR with the manufacture of Plumbers', Gas and Steamfitters' Brass Goods is open for position as Superintendent of factory. Address No. 455, "Domestic Engineering," Chicago.

Help Wanted.

WANTED—PLUMBERS THAT CAN DO lead work. H. Ewinger Plumbing and Heating Co., Burlington, Iowa.

WANTED—GOOD LIVE SPECIALTY man to call on the plumbing trade. None but experienced men need apply. Address No. 451, "Domestic Engineering," Chicago.

WANTED—A GOOD MAN WITH SOME experience; sober, ambitious, and willing to work to sell Water Lifts. Address No. 450, "Domestic Engineering," Chicago.

WANTED—MANAGER TO TAKE ENtire charge of a concern manufacturing plumbers' cast-iron enamel ware. Address No. 391, "Domestic Engineering," Chicago.

WANTED—A FIRST CLASS PLUMBer; state age and experience; steady job to right party; must be union man. Address Chas. D. Matthews, 721 Broadway, Columbia, Mo.

WANTED—EPERIENCED MAN IN plumbing and steam supplies for estimating, office work, and waiting on showroom trade. Must be experienced, or need not apply. Excellent opportunity for advancement. Address Ford & Kendig Co., 1428 Callowhill St., Philadelphia.

WANTED—A FIRST-CLASS PLUMBER and fitter, with some knowledge of tin work; all pipe machines run by electricity; we want a steady, sober man of social disposition, and a good mechanic; steady job. Address the Arthur W. Murray Co., Hoopeston, Ill.

For Sale

FOR SALE — WELL-ESTABLISHED plumbing and sheet-metal business in town of 6,000 inhabitants, within 75 miles of Dallas, Tex. Address No. 422, "Domestic Engineering," Chicago, Ill.

FOR SALE—PLUMBING, HEATING AND Tinning shop; splendid opening for man who can do own work; nearly all the business of the town. Address No. 413, "Domestic Engineering," Chicago.

FOR SALE—PATTERNS AND TOOLS for a complete line of plumbers' goods, up-to-date and in use only a short time; will sell at one-half price. Address 411, "Domestic Engineering," Chicago.

FOR SALE — PLUMBING, HEATING, and Tinning shop; stove store; good business, within 25 miles of New York City; will sell cheap. Address No. 453, "Domestic Engineering," Chicago.

FOR SALE—PATENT $65,810, GRANTed to me for drainage clamp. Can be made adjustable to fit any size cover, and cannot be removed without key. I wish to sell this patent and will send sample to anyone interested. W. J. Taylor, 513 S. 12th St., Philadelphia, Pa.

Miscellaneous.

EXPERIENCED AND ENERGETIC party, well acquainted with plumbing and steamfitting goods, wishes to represent American manufacturer as Sales Agent in Canada. Could arrange to assemble or manufacture suitable articles, if desired. Address No. 454, "Domestic Engineering," Chicago.

WANTED—PARTNER WITH $1,000 IN established plumbing and heating business. Address No. 425, "Domestic Engineering," Chicago.

WANTED—PARTY WITH $5,000 OR more to invest in large well-established plumbing and heating business in Idaho. One who has experience in bookkeeping and buying preferred. Would sell business or part thereof. Address No. 395, "Domestic Engineering," Chicago.

WANTED—AGENCIES. WE ARE IN A position to take the agency for Pacific Coast for first-class articles which have a good demand in the plumbing and heating trade. We have a line which we are introducing with great success and will add to it. Address No. 417, "Domestic Engineering," Chicago.

MANUFACTURERS—IF YOU HAVE A specialty of merit to introduce in the western trade, in the heating and plumbing line or in connection with the building line, we are prepared to take your agency, having thorough acquaintance with the trade. Address No. 423, "Domestic Engineering," Chicago.

WANTED—ENERGETIC MAN WITH $8,000 to take half interest in thriving well-established plumbing and heating business in a live Ohio town of 15,000 population, doing all the high-grade work in town and having good trade in mill supplies; want a man with business ability who can care for financial end of the business and the bookkeeping. Address No. 410, "Domestic Engineering," Chicago.

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Parties having saleable specialties which they desire to have manufactured or marketed are invited to submit particulars. Address No. 333, "Domestic Engineering," Chicago.

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DEAN'S SYSTEM OF GREENHOUSE HEATING by steam or hot water; used for years; convenient and reliable; makes greenhouse heating estimating very simple. Flexible cloth bound, 5½x7¾ in., 46 pp. Postpaid, $2.00.

MAKING THE BUSINESS PAY. Letters of John Burton, retired successful plumber and steamfitter, to his nephew still in business. Practical, instructive, entertaining, a guide to better business. Cloth bound, 5½x7¾ in.; 168 pp. Postpaid, $1.00.

SWIMMING POOLS. Their construction; cold and hot water supply; various methods of heating the water; directions as to selecting correct sizes of heaters. A practical guide to the subject. Over thirty illustrations; 6¼x4¾ inches. Postpaid, 50 cents.

SIZE OF FLOW AND RETURN STEAM MAINS. Contributions from thirty heating engineers of different cities in United States, giving current practice; full of practical advice and useful tables. Bound in boards, 6¼x4¼ in., 104 pp. Postpaid, 50 cents.

TABLES FOR CALCULATING SIZES OF STEAM PIPES. These tables furnish a method of determining sizes of steam pipes for low pressure heating without laborious mathematical calculations. Bound in cloth; 4½x6⅞ in.; 47 pp. Postpaid, $2.00.

DEAN'S STEAM FITTER'S COMPUTATION BOOK. Tables for finding cubical contents of rooms and radiation required, also general information on points of interest to steam and hot water fitters. Flexible cloth bound, 5x7½ in., 90 pp. Postpaid, $2.50.

SANITATION IN THE MODERN HOME. An invaluable guide to the architect, plumber, heating engineer and house owner, telling just what is necessary to make a home completely sanitary from the subsoil to the roof. 8x5¾ in.; 272 pp.; bound in cloth. Postpaid, $2.00.

SANITARY SEWERAGE OF BUILDINGS. An authoritative statement of the principles and practice of sewering buildings, including the design and construction of plumbing systems, disposal of sewage in unsewered localities, etc. 8x5 in.; bound in cloth; 209 pp. Postpaid, $1.50.

ROUGHING-IN HOUSE DRAINS. A complete guide to the work of roughing-in plumbing, from the digging of the sewer to the finishing length of the soil and vent stacks, giving each step to be taken and telling how and why it is done. 6¼x4¼ in.; 184 pp.; bound in boards. Postpaid, 50 cents.

PLUMBING CATECHISM. Second edition. This book formulates, in question and answer form, the basic principles of plumbing design and practice. It is therefore especially commended to students in engineering and trade schools, and to master and journeymen plumbers, preparing for examinations. Bound in cloth, 6¾x4¾ in.; 125 pp. Postpaid, $1.00.

NOTES ON HEATING AND VENTILATION. Second edition. This book is a resume of lectures delivered to classes in heating and ventilation at the University of Michigan. It is written primarily for the steamfitter and designer of heating systems. Reduced to as brief a form as possible, so that readers can readily find notes or data desired. Bound in cloth, 6¾x4⅝ inches; 272 pp.; postpaid, $2.00.

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Saves its cost in a very short time

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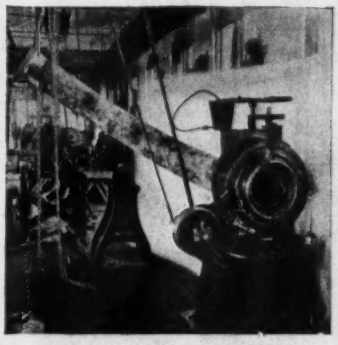


The Curtis & Curtis Co.
25 Garden St., Bridgeport, Conn.

"ELASTO"
FLEXIBLE LEAD PIPES AND BENDS

"ELASTO"

Patented June, 1910

Insure water closets against breaking in case of shrinkage or settlement of walls or floors, or settlement or derangement of the stacks. The closets cannot possibly be injured for the folds of the **"Elasto"** fitting yield to the slightest pull or pressure without damage to the fixture. Is not that valuable feature enough to sell the **"Elasto"** on sight? You have only to explain the merits of flexible lead fittings to secure an order. **"Elasto"** fittings are made in straight pieces of various lengths and in long and short bends.

ASK YOUR JOBBER FOR THEM

MADE ONLY BY THE

COSGROVE-COSGROVE MFG. CO.
PHILADELPHIA, PA.

THE MONASH RADIFIER VALVE

on a Vacuum Steam Heating System insures a perfect up-to-date job.

Write for interesting facts—valuable to every steam-fitter.

Monash-Younker Co.

NEW YORK CHICAGO

FERRULES

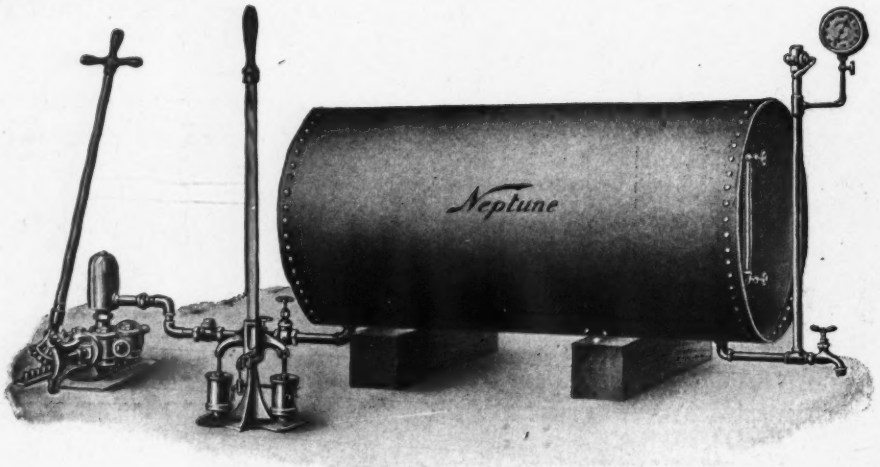
The kind free from flaws and blemishes that will give you no trouble bear the name Mueller.
See page 21.

MUELLER

INDEX TO CONTENTS PAGE 317 | BUYERS' DIRECTORY PAGE 66 | INDEX TO ADVERTISERS PAGE 58

SPECIAL EXTRA

Get the story of Neptune Water Supply Systems. If interested sign coupon and return—if not you should be and don't realize the opportunity you are missing to build up a profitable business —opportunities don't grow on trees nor come too often.



ONE OF OUR MANY OUTFITS for supplying sparkling fresh water to any house under any pressure desired.
We will design a system to suit any requirements.

FLECK BROS. CO.,

House of Quality
PHILADELPHIA, PENN.

Mail This Coupon Today!

FLECK BROS. CO.,

Gentlemen:—

If at no cost to me place my name on your regular mailing list, for the water supply line.

Name .....

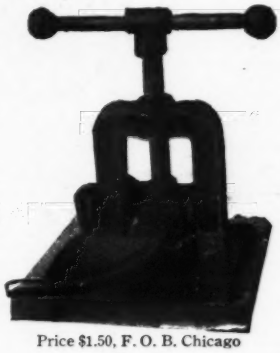
Street .....

Town ..... State .....

Have you been handling any water supply system.....

If so, what make..... Have you any prospects at present.....

Give details of present requirements.....



Price $1.50, F. O. B. Chicago

ANYBODY

can do perfect pipe-bending with a

Star Pipe-Bender

When ordering state what vise wanted for. Unless otherwise ordered, bender will be sent to fit Crane No. 1 pipe-vise.

Here are 10 Reasons Why You Should Use This Bender:

1. It is inexpensive. 2. No parts to get out of order. 3. It will make perfect bends. 4. It is unbreakable. 5. It will save time and money. 6. All bends will be uniform. 7. Workmen can carry them in tool bags. 8. Easily applied or removed. 9. Simple to operate. 10. No split or kinked pipe.

JOBBERS ATTENTION:

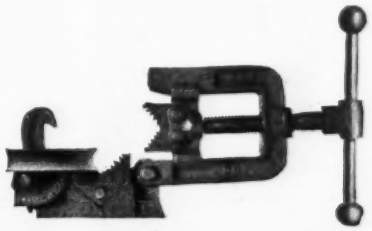
It is our intention to market this article through the jobbing houses. Write for particulars and prices.

Made to fit Crane No. 1 and 2 and Reed No. 21 pipe-vises.

If your jobber cannot supply you with a Star Bender, write us for the name of one who can.

Send for Illustrated Pamphlet

R. C. Bierdemann & Co.
4740 N. Ashland Ave., CHICAGO



GURNEY
HOT WATER HEATERS
STEAM BOILERS, RADIATORS

THEY GIVE COMPLETE SATISFACTION.

SEND FOR LATEST CATALOGUES

GURNEY HEATER MFG. CO.,

12 EAST 42ND ST., NEW YORK. 188-200 FRANKLIN ST., COR. PEARL, BOSTON, MASS.

WROUGHT PIPE
BOILER TUBES
FITTINGS
COCKS
VALVES

CORNELL & UNDERHILL

NEW YORK

Supplies and Specialties for Steam, Water, Gas, Oil and Ammonia

Office, Warehouse and Shops:
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IDEAL WRENCH

GRIPS PIPE AND FITTINGS
OF EVERY DESCRIPTION

Sold by all Jobbers

Send for valuable information

KROESCHELL BROS. CO.
470 W. Erie Street, Chicago

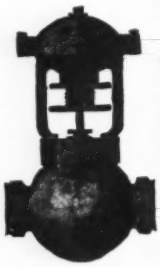
IDEAL WRENCH IDEAL WRENCH

The "BUCKEYE" Water Lift Pump

Only SEVEN PACKINGS or CUP LEATHERS; only TWO STUFFING BOXES---less than half the parts that go to make up other lifts on the market. Write for catalogue and prices.

The Buckeye Pump & Mfg. Co. :: **Columbus, Ohio**

AN IDEAL VALVE



For Automatically regulating the pressure of air, gas or water, is Hughson's "Eclipse" Air Regulating valve illustrated herewith.

Send for catalogue of our entire list.

"ECLIPSE STEAM SPECIALTIES"

E Reducing Valves.
C Low Pressure Regulating Valves.
L Back Pressure Valves.
I Vacuum Pressure Regulating Valves.
P Automatic Pump Governors.
S Pump Regulators.
E"

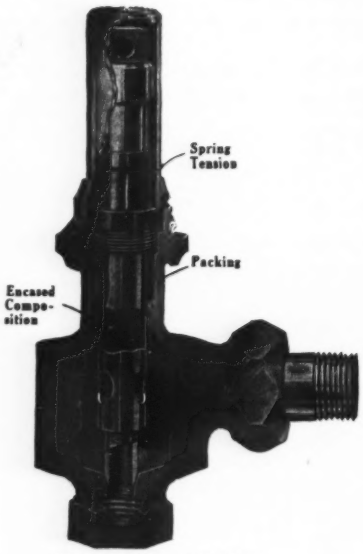
Hughson Steam Specialty Co.
Successor in the manufacture of the Eclipse Steam Specialties of the John Davis Co.
5021-5023 State Street, CHICAGO

A Complete Catalog of Plumbers' Specialties

Chains, Eight Hooks, Split Links, Jack Chains, Tank Pulls, Pipe Straps, etc., are fully described in our latest catalog. A copy is free to you upon request to

The Smith & Egge Mfg. Co.
Bridgeport, Conn.

The National Thermostatic Trap



National Thermostatic Trap

We guarantee these traps to work perfectly when properly installed.

is superior to any other thermostatic trap because: It is self-adjusting; it responds to a few degrees of temperature; is easily kept clean; and the composition is encased in a brass tube, which compels it to seat properly always.

Owners Will Buy

this trap when its good points are brought to their attention. It positively prevents water-logging, poor circulation, etc. In connection with a vacuum pump it will work perfectly, effecting great economy.

SEND FOR CIRCULAR AND DISCOUNTS

National Steam Specialty Co.

12-14 South Clinton Street, CHICAGO

SURPLESS, DUNN & CO., 74 Murray St., N. Y.

See "Sweet's Index" pages 850 and 851

THE

ARMSTRONG MANUFACTURING CO.

284 Knowlton St., BRIDGEPORT, CONN.

NEW YORK OFFICE: 248 Canal Street CHICAGO OFFICE: 171 N. Jefferson Street

Genuine Armstrong Stocks and Dies

PIPE MACHINES
FOR CUTTING OFF
AND THREADING PIPE
OR BOLTS
Hand or Power

HINGED PIPE VISES
BARD ADJUSTABLE
BUSHINGS
NIPPLE HOLDERS
RATCHET ATTACHMENTS
PIPE CUTTERS

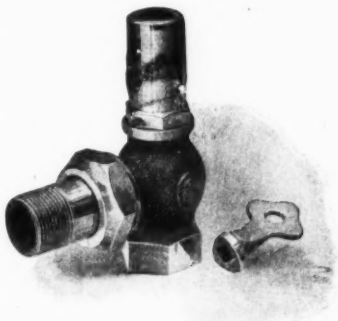
CATALOGUE Mailed on Request

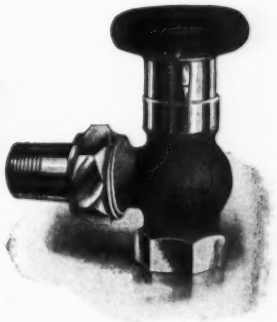
ATMOSPHERIC SYSTEM OF STEAM HEATING

is based on the correct principle. Steam is supplied in vapor form from the ordinary house boiler or from the central station.

Actual practice has demonstrated this system will save from 25 to 40 per cent in fuel bills. Furthermore it is easier to control and maintain, and is the ideal system for use in residences, public buildings, churches, office buildings, schools, etc.

Naturally you are interested so write for catalog No. 119 giving full information. Estimates furnished.





"ADSCO" Graduated Radiator Valve

Our "ADSCO" valves are graduated to supply any given amount of radiation and may be regulated to suit weather conditions.

American District Steam Co.

Lockport, N. Y. North Tonawanda, N. Y. Chicago

LEST YOU FORGET

WE AGAIN ASK YOU TO READ THE
"Comparative Corrosion Test"

Please Remember

PORCELAIN ENAMELED IRON TANKS

are made of one piece American Ingot Iron. That they are the neatest in appearance, also the most reliable closet tanks made, and that they bear our 5-year manufacturer's guarantee.

THE ENAMELED TANK CO.

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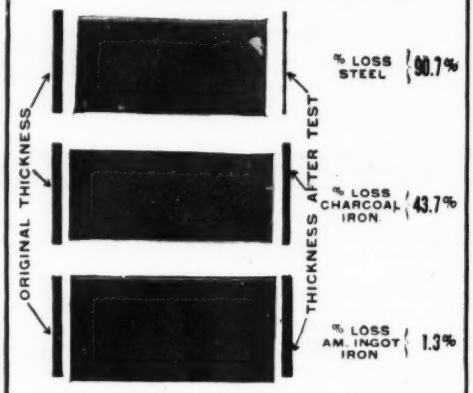
COMPARATIVE CORROSION TEST

STEEL
99.94% PURE CHARCOAL IRON
TRADE MARK AMERICAN INGOT IRON
SAMPLES IMMERSED IN 25% SULPHURIC ACID FOR 2 HRS.



AMERICAN INGOT IRON 99.94% PURE
USED EXCLUSIVELY BY US IN THE MANUFACTURE OF OUR
WHITE PORCELAIN ENAMELED IRON CLOSET TANKS

THE ENAMELED TANK CO. KALAMAZOO, MICH.
TEST APPROVED S. F. Ahlbrandt CHEMICAL ENGINEER

SOMETHING ENTIRELY NEW IN

SILL-COCKS

Semi-Finished, Polished aluminum wheel Style N. Style O---Heavy rough pattern built for service.

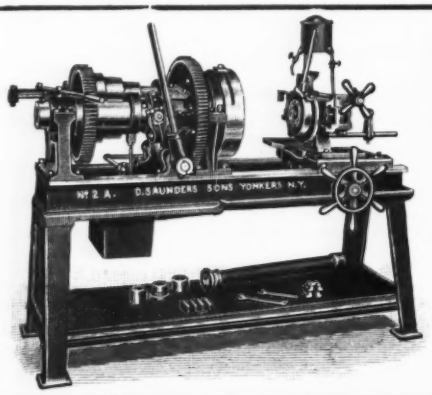
STYLE N — Both shown in Catalog D. — STYLE O

KINSEY & MAHLER CO. *PEORIA, ILL.*

ALL PLUMBERS AND FITTERS HAVE VISES

But All of Them have not found out that the **Parker Combination Vise** is the best on the market. Six sizes, and every one O. K. Sold by all jobbers.

Chas. Parker Co.
FACTORIES:
Meriden, Conn.
NEW YORK SALES ROOMS,
32 Warren Street



Saunders' Improved Pipe-Threading Cutting and Nipple Machines

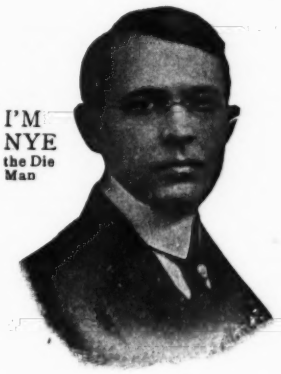
with patent lever gripping chuck has for years been recognized as the best tool of its kind on the market.

Pipe or nipples instantly gripped or released by movement of the lever. Has Standard Adjustable Expanding Die-Heads, one for each size. A great saver of time, material and money. Especially adapted for steam and gas fitters' use. Our catalogue "R" goes into detail. Write for a copy.

D. Saunders' Sons, Inc.

YONKERS, N. Y.

Kindly quote "Domestic Engineering" in writing advertisers.

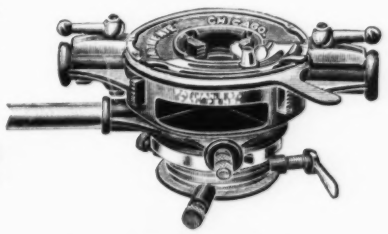


It is quite natural for you to say, "Oh well, Nye makes 'em,—he is prejudiced" but you cannot go behind the verdict of what the men, who use them, say. Read the following:

H. C. MOEN
CONTRACTOR FOR
STEAM AND HOT WATER HEATING, PLUMBING,
SEWERING AND GAS FITTING.
ESTIMATES CHEERFULLY FURNISHED
CRESCO, IOWA, Sept 7 1910

The Nye Tool & Machine Works.
Chicago, Ill.
Gentlemen:—
The extra No. 35 Nye Ratchet Stock has just arrived by express. Many thanks I feel now that I will go into my fall work of heating with the best stocks I ever had. I have seven different die stocks in my shop and my boys make it a point to come early in the morning to get the Nye stock first.
Yours truly,
H. C. Moen.

The No. 35 Nye Hand Stock, ratchet form, threads from 1 to 2" inclusive,—has automatic bushings. Price complete, $15.00 net.



NYE, THE DIE MAN

The Nye Tool & Machine Works
114 NORTH JEFFERSON STREET CHICAGO, ILLINOIS

National Nipple Chuck

If you are a pipe-fitter, you need this tool. Removes nipples with ease and doesn't injure nipple or pipe. Placed in a vise, it will hold pipe so that any ordinary die will make nipples from small pieces usually thrown away. Holder for right and left, close and long nipples.

Made of high grade tool-steel, spring tempered, for ¾, ½, ⅜ and ¼-inch standard thread. Efficient, easy, compact and economical. Buy from your jobber—or buy from us.

NATIONAL NIPPLE CHUCK CO., 19 High Street, Boston

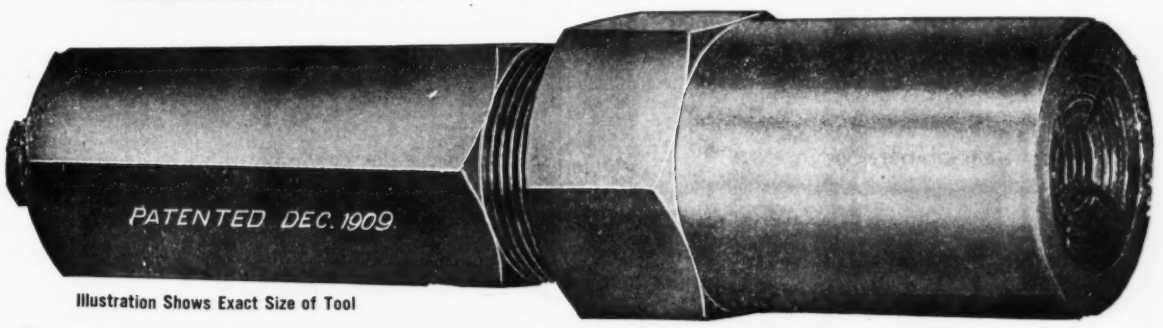


Illustration Shows Exact Size of Tool

"OHIO M"

Instantaneous

A dozen distinct and direct reasons are plainly stated here, proving why the "OHIO M" Instantaneous Water Heater is the best to use and the best to sell.

It is the heater the world has waited for; the embodiment of all the latest approved features, constructed right so as to be right in operation.

Heaters made for ordinary gas, natural gas, acetylene gas, gasoline gas and gasoline.

HERE ARE THE "REASONS WHY":

1. No Odor. 2. No Soot. 3. No Condensation. 4. No Screens in Burner. 5. No Trouble from Down Draft. 6. No Insurance Regulations for Vent Pipe to Bother about. 7. Saves Time and Material for Vent Pipe. 8. Saves Time and Material for Drip Pipe. 9. Raises Two Gallons of Water 50 degrees in One Minute. 10. Sets where No Other Type Can Go. 11. Harmonizes with modern bath room because there is No Unsightly overhead piping. 12. Sells at a Reasonable Price.

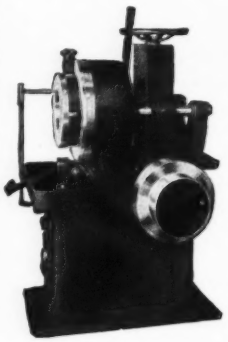
SPECIAL TO JOBBERS

Jobbers who want a good proposition should write us early.

McCORMICK MFG. CO.
Dept. D., Dayton, Ohio

Water Heater

ONE CUTTING



with a "Loew Victor" Pipe Machine cuts full, clean, perfect threads whether pipe is exact, or over, or under size. With a "Loew Victor" it is unnecessary to lock the Die Head to prevent the dies from slipping. It is the most *modern* Pipe Cutting Machine made. Send for details. :: ::

The Loew Manufacturing Co.
CLEVELAND, OHIO.

JOHN SIMMONS CO.

104-110 CENTRE STREET NEW YORK, N. Y.

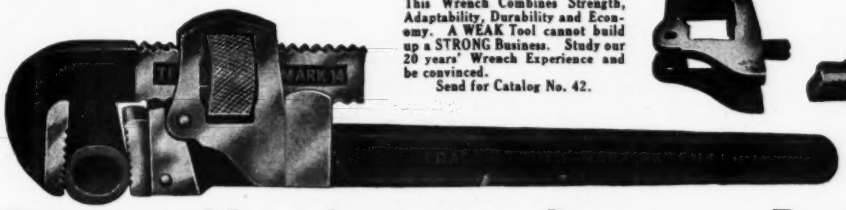
Wrought and Cast Iron
PIPE

Malleable and Cast Iron
FITTINGS

Brass and Iron—Globe and Gate
VALVES

Tools and Specialties
FOR
STEAM
PLUMBING
GAS, AND
HYDRAULIC
ENGINEERING

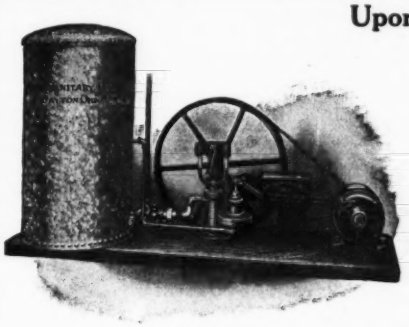
Trimo Pipe Wrench and Its Interchangeable Parts



This Wrench Combines Strength, Adaptability, Durability and Economy. A WEAK Tool cannot build up a STRONG Business. Study our 20 years' Wrench Experience and be convinced.
Send for Catalog No. 42.

The name **Trimo** found on every **Trimo** tool

Trimont Manufacturing Company, Roxbury, Mass.



Upon Request, We will send **On Approval** to any responsible party

Our New "SANITARY"
AUTOMATIC ELECTRIC WATER LIFT

½ Cent Per Day

Is the cost of supplying the average residence. Takes the place of troublesome Water Lift and costs only about **Ten Dollars** more. It is absolutely noiseless in operation. Operated by ⅛-H. P. motor—pumps 120 gallons per hour—40 pounds pressure in tank. It includes everything shown in cut. **Write us today.**

THE SANITARY PUMP COMPANY
16 So. Canal Street, Dayton, Ohio

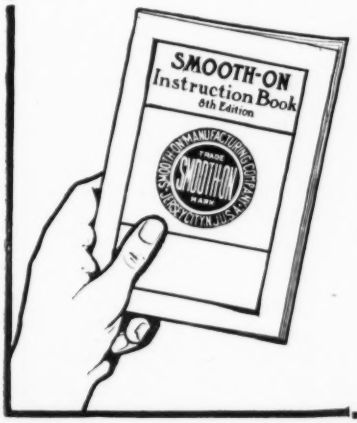
SEND FOR FREE

INSTRUCTION BOOK

This book tells how to make many permanent repairs to boilers, heaters, tanks and piping; also how to make lead joints without caulking the lead by using the well known Smooth-On iron cements.

Every plumber and steam-fitter should have a copy.

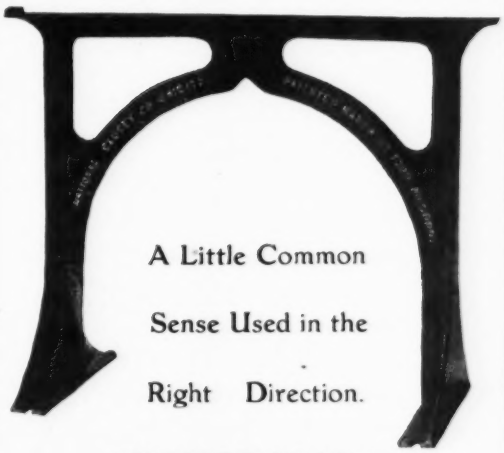
This Book is Free.



SMOOTH-ON MFG. CO.,
JERSEY CITY, N. J.

CHICAGO WAREHOUSE
231 N. Jefferson Street

SAN FRANCISCO WAREHOUSE
94 Market Street



A Little Common Sense Used in the Right Direction.

"NEVERSLIP" LAUNDRY TUB LEGS.

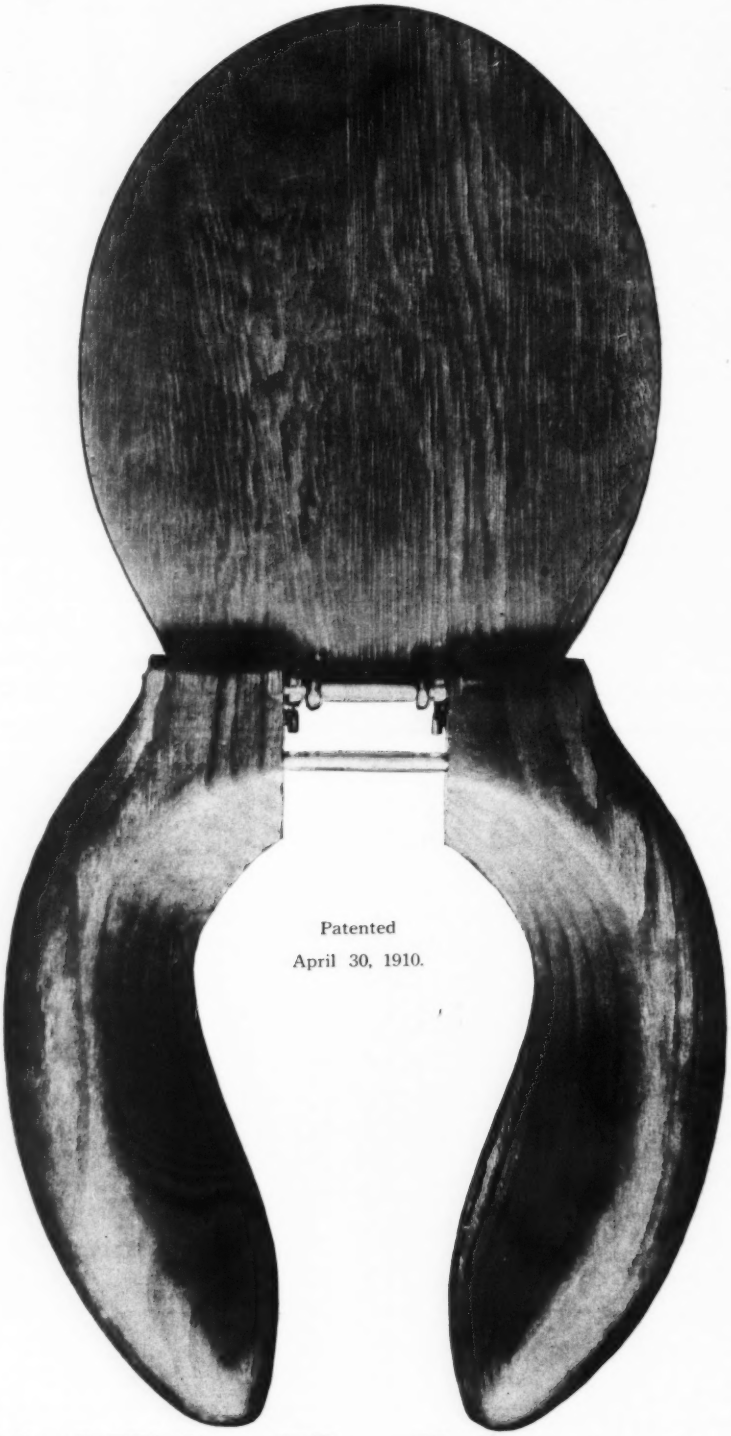
save HALF the time usually required to set tubs and there is no danger of breakage.

Just put them on the floor, they won't tip over. See the wide foot rest.

NATIONAL CLOSET MFG. CO.,
SOLE AGENTS
758-762 W. Van Buren St., Chicago
"GOOD CLOSETS, TOO"

THE QUINN SANITARY SEAT

The entire seat may be raised by taking hold of either side. It is a strictly sanitary seat.



Patented
April 30, 1910.

The Plumbing Trade should write for prices and samples.

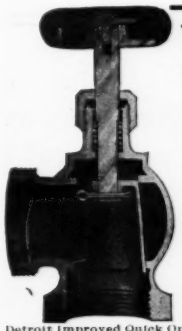
QUINN MFG. CO., Kalamazoo, Mich.

The "J.R.S." Vent Screen

The feature of this screen is the manner of attachment to the pipe, which is made by screwing the set-screw into the nut which slides up and down in a tapering gutter; making it easy to put on and take off for repairs. Can be used on Standard or Extra Heavy pipe without hubs.

Ask your jobber for it, or write to

J. R. SMITH & CO.
MECHANICSVILLE, N. Y.



Detroit Improved Quick Opening Hot Water Radiator Valve

You Can Identify The Genuine "DETROIT" RADIATOR VALVE

BY THE TRADE MARK

Imitation is the most sincere tribute ever offered to superiority, so look out for "just-as-good" substitutes.

Whether you use or sell radiator valves in small or large quantities, we want you to have our new valve catalogue, "A 36". We will mail it promptly on receipt of request.

TRADE MARK
Reg. U.S. Pat. Off.

DETROIT LUBRICATOR COMPANY, DETROIT, U. S. A.

RICE

The Best Bend

Constructed of cast-iron and brass and it is better than lead bends because it is more sanitary, durable and easier to install. Is the most practical connection between water closet and soil pipe. Made to calk or for Durham System. Write for booklet.

The Edward J. Rice Mfg. Co.
Manufacturers
11 Plymouth Av. S.
ROCHESTER, N. Y.

We Manufacture Incandescent Burners

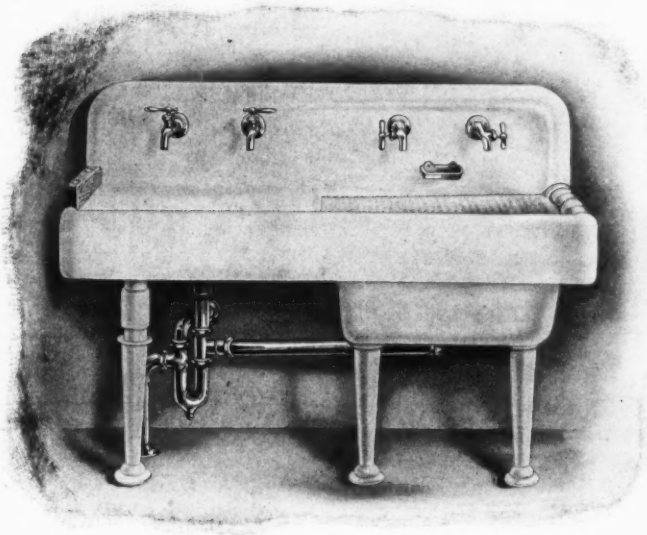
INVERTED AND UPRIGHT

No. 20—Style A

Our Line is Complete
Designs Artistic
Quality Unexcelled

We guarantee our burners to produce the highest candle power. Write for illustrated price list.

The Frederick-Elder Co.,
Tel. 91 Bridgeville, Pa.



THERE ARE NO TWO WAYS ABOUT IT

Our sink and laundry tray combination is "the goods." Plate F-300 proved so popular and the demand for F-302 was so insistent that—here it is. We are making it "two ways"—Plate F-300 with sink on right and tray on left; F-302 with tray on right and sink on left side. Both now made with 6 in. apron, completely hiding the bottom of sink. Can be furnished with wringer holder as shown, if desired.

Dimensions, list, etc., of Plate F-302 same as F-300. The latter is shown on page 122 of our Catalog F. If you haven't a copy, ask for one.

New York Office and Display Rooms:
76 West 30th Street,
Warehouse, 558 W. 34th St.
THOS. H. HUTCHINSON, Mgr.

San Francisco Office and Display Rooms:
1749 Sacramento St.,
CHAS. H. STANYAN, Sales Agent.

Chicago Office: 163 Randolph St.
HARRY VERBEEK, Sales Agent.

THE CAHILL IRON WORKS

Portland, Ore., Office and Warehouse:
550 Sherlock Building,
H. A. HEPPNER & CO., Sales Agents.

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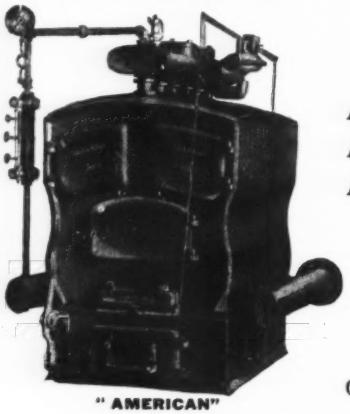
RUSSELL D. KNIGHT, Sales Agent.

CHATTANOOGA, TENN.

"K-M-C" BOILERS

Particularly Well Adapted to Western Fuels and Conditions

KEWANEE RADIATORS



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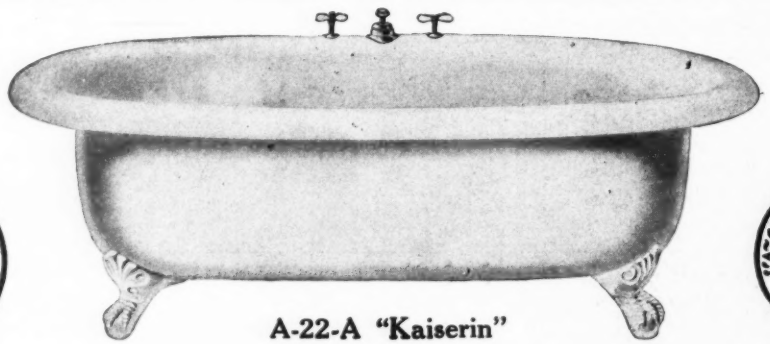

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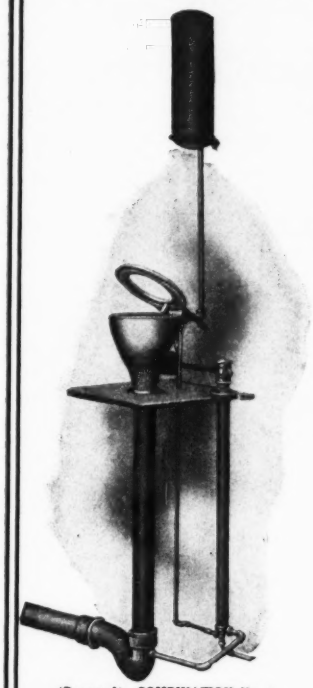

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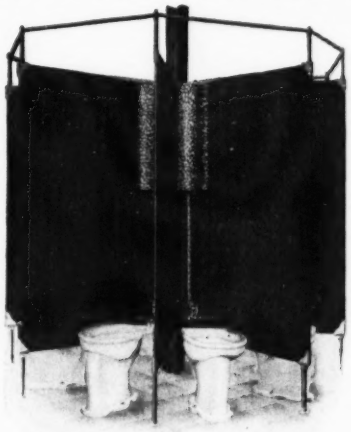

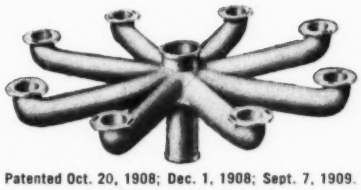

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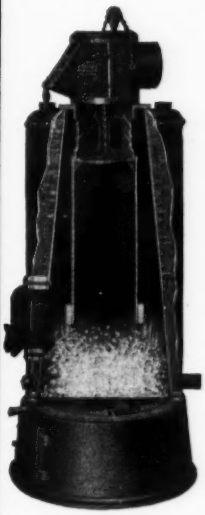

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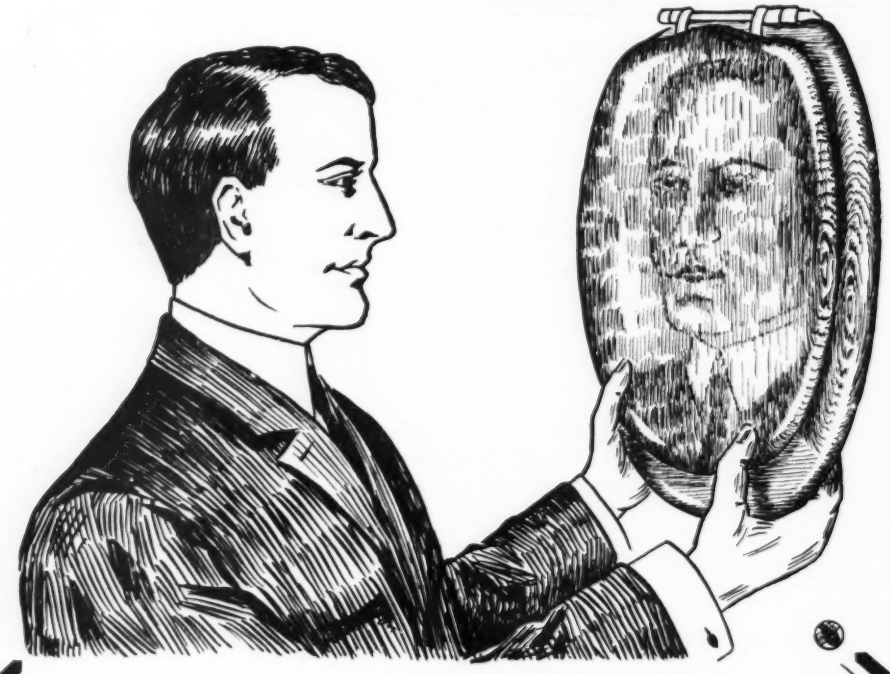

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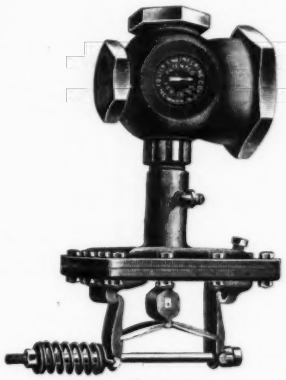

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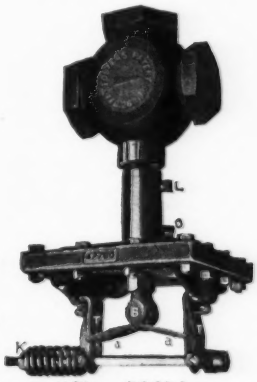

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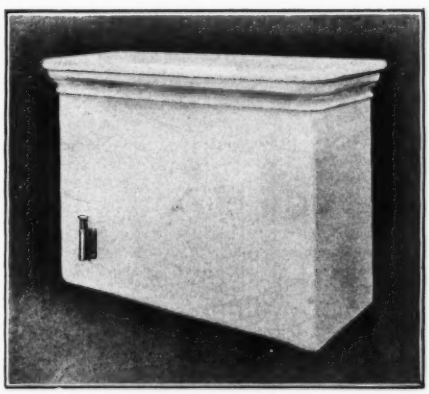

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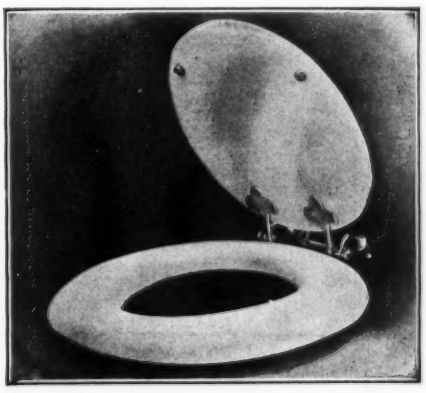

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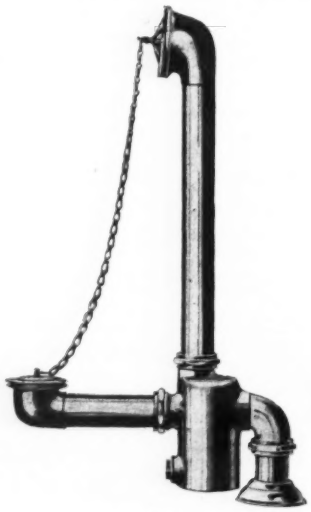

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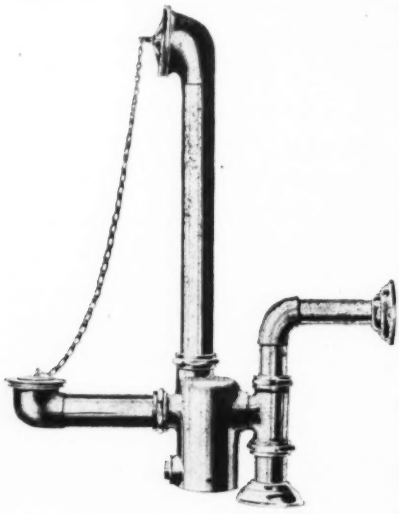

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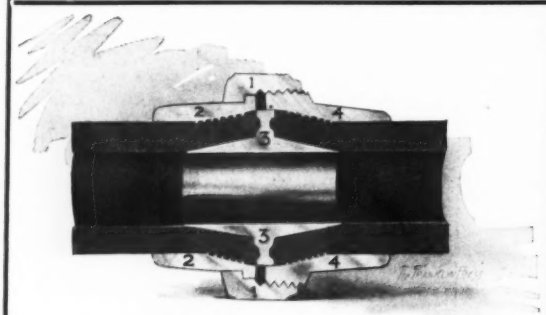

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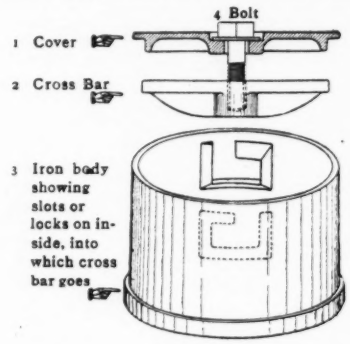

Figure 1

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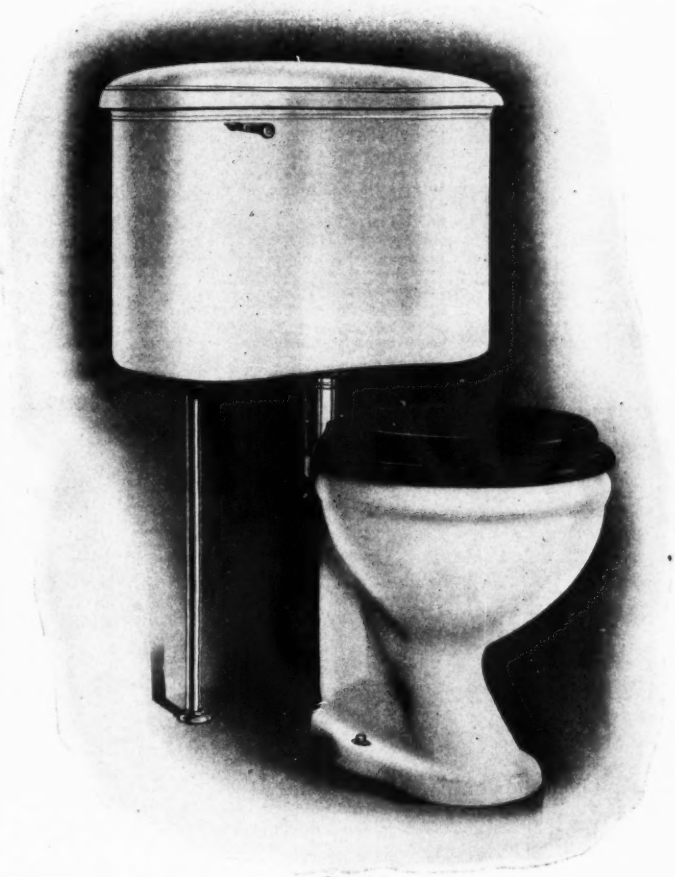

Plate A 7

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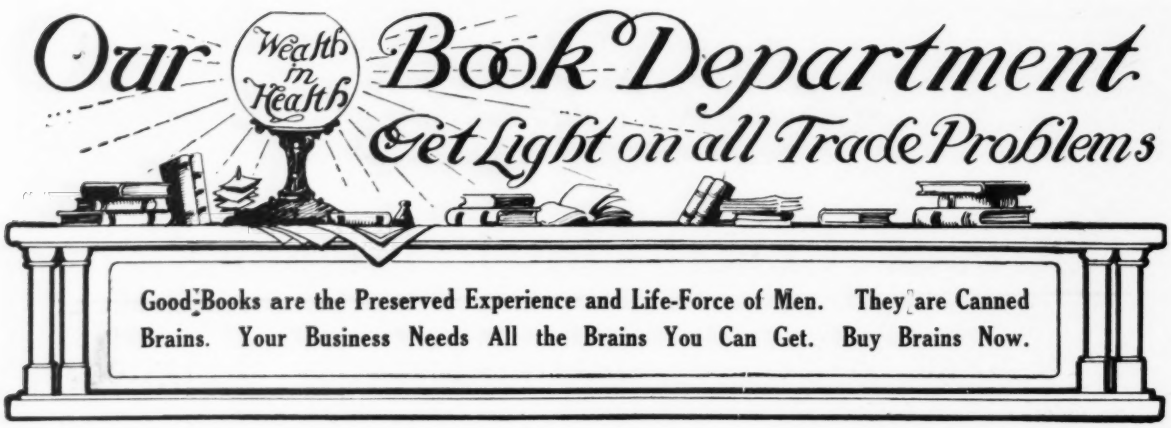
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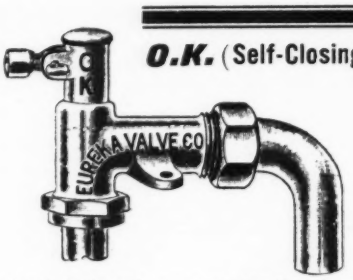

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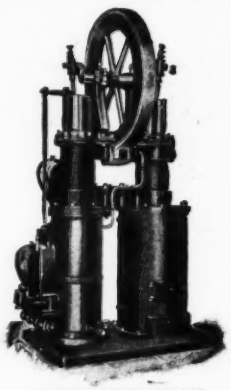

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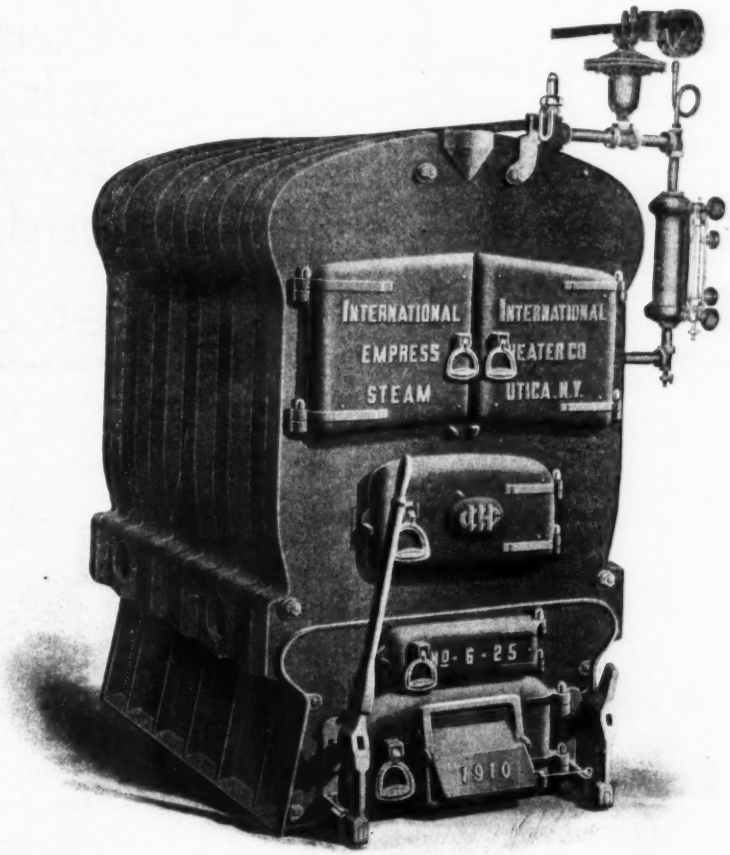

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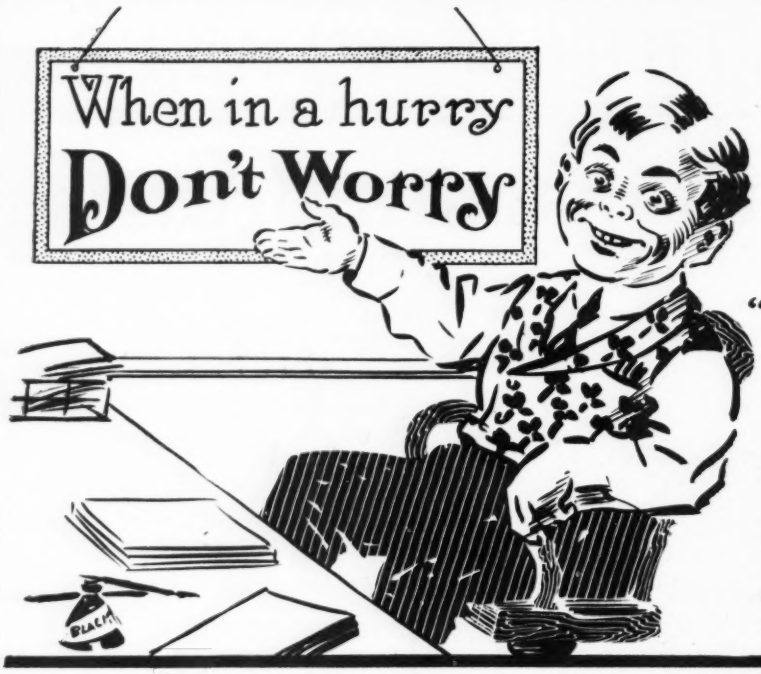
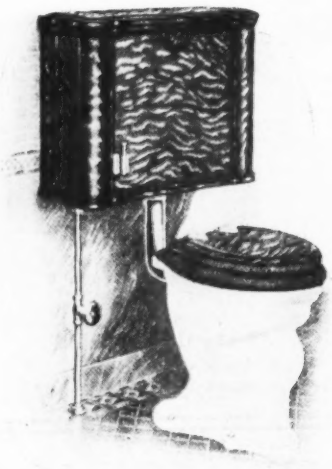


"What d'ye tink o'me new motto card?"

"Red Casey"

NO small factor of the Peerless System of doing business is the effective SERVICE we can give you. "When in a hurry—Don't Worry." Just send in your orders and we'll do the rest. That's the advantage to you of dealing with a concern making every part itself and with a large capacity. We turn out over 1600 Peerless Combinations complete with Don't Worry Seats every week.



"Red Casey" says—"Don't worry about orders. Use the Blue Book." Have you one?

The PEERLESS TRADE MARK SELLING CO.
EVANSVILLE, IND.

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You Should be Especially Interested

In ferrules that will give you satisfaction—the kind that won't split or break and are free from sand holes and blemishes.

Mueller ferrules and trap screws are that kind. They are made of Mueller red brass in twenty patterns, sound as a dollar and Unconditionally Guaranteed.

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TRADE MARK MUELLER REGISTERED

H. MUELLER MFG. CO.

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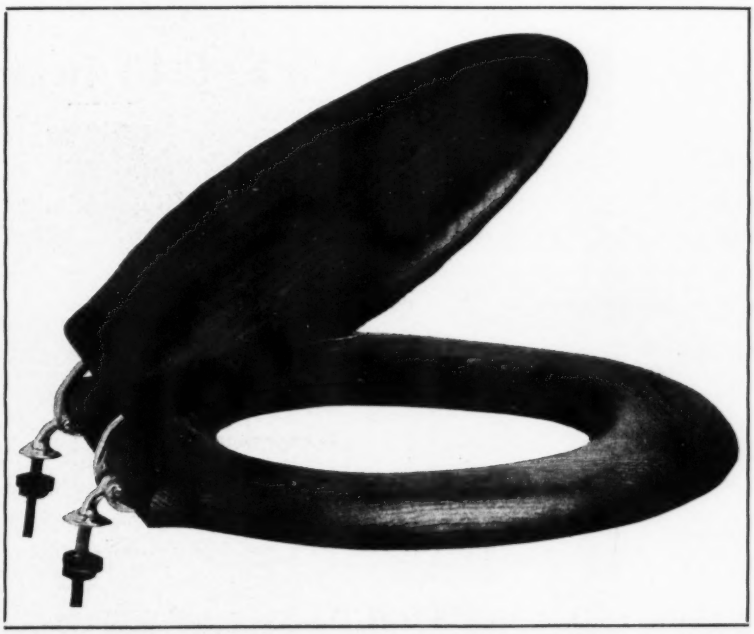
West Cerro Gordo St.

Eastern Division
NEW YORK, N. Y., U. S. A.
254 Canal St., cor. Lafayette

Do You Know the Keystone Seat



is the strongest and most durable seat made?

(READ GUARANTEE)

GUARANTEE

The Keystone Closet Seat is GUARANTEED FOR SIX YEARS not to break or split or come apart at the joints.

Mr. Plumber

If your jobber does not handle our Seat, write us and we will see you are supplied.

E. C. B. JUDD, Inc.

Manufacturer KEYSTONE CLOSET SEATS

Muskegon :: Michigan

Take The Time-Read Carefully

Hot Water Tank or Boiler Regulator No. 10 Replacing Nos. 1 and 2

Our HOT WATER TANK OR BOILER REGULATOR No. 10 is a great improvement on the HOT WATER THERMOSTAT which we have used before, as it has a thermometer in connection with the Thermostat which shows you at any time the temperature of the water.

This THERMOSTAT is not at all complicated, very simple and easy to install and needs no adjusting. All that is required is to set it at the temperature you wish the water and when it reaches the desired degree the THERMOSTAT closes off the source of heat, preventing the temperature from rising still further.

The temperature may be varied at any time by merely moving the contracts hands as desired.

THESE HANDS ARE ADJUSTABLE AND MOVABLE INSTANTLY, THE SAME AS ON A CLOCK.

HOT WATER TANK OR BOILER REGULATOR No. 10 is guaranteed to give perfect satisfaction, and can be used in all cases where a ¾-in. hole can be tapped into the boiler or tank. Size of THERMOSTAT, 4 in., length of extension, 4 in. List price of REGULATOR No. 10, complete, $50.

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General Offices, Palace Bldg,. Minneapolis

218 E. Washington St., Syracuse 402 Garfield Bldg., Cleveland 144 High St., Boston 1215 Harney St., Omaha

PLUMBERS AND STEAM FITTERS

know that there is nothing more aggravating than tearing down a line of pipe to replace leaky and cracked fittings. Your profit is decreased when you find fittings tapped to varying gage, some having to be retapped to allow pipe to enter, others being threaded too large. You can avoid trouble and expense by using

PITTSBURGH MALLEABLE IRON PIPE FITTINGS

A few advantages of "P" Fittings

IRON

"P" Fittings are made from refined air furnace iron. Compare this iron with that of other manufacturers using cupola iron. A hammer test will tell.

PATTERNS

Every detail of the patterns has been carefully studied from the ⅛" fitting to the largest. They are so proportioned as to meet all requirements without having any unnecessary metal. Ells, tees, crosses, etc., all have the same center to face dimensions making them interchangeable on the pipe, a feature omitted by other makers.

THREADS

"P" Fittings are all threaded true to Brigg's standard gage—¾" taper to the foot. All fittings are threaded true to angle and in perfect alignment. All threads conform to U. S. Gov. specifications. The starting point of the thread is recessed by machine to allow easy starting of the pipe.

HYDRAULIC TEST

"P" Fittings are made to stand tests far in excess of pressures at which they will ever be used. Accounts of tests made on "P" Fittings have been given editorial notice in many of the leading technical journals. These tests proved that "P" Fittings have a factor of safety of 20.

APPEARANCE

"P" Fittings are all smooth in appearance and by our process of moulding are made without a perceptible parting between the two halves. They are clean and bright and are as fine in appearance as they are in quality.

FINAL

Consider carefully each of the above mentioned points and you will find that by using "P" Fittings you can avoid trouble and expense.

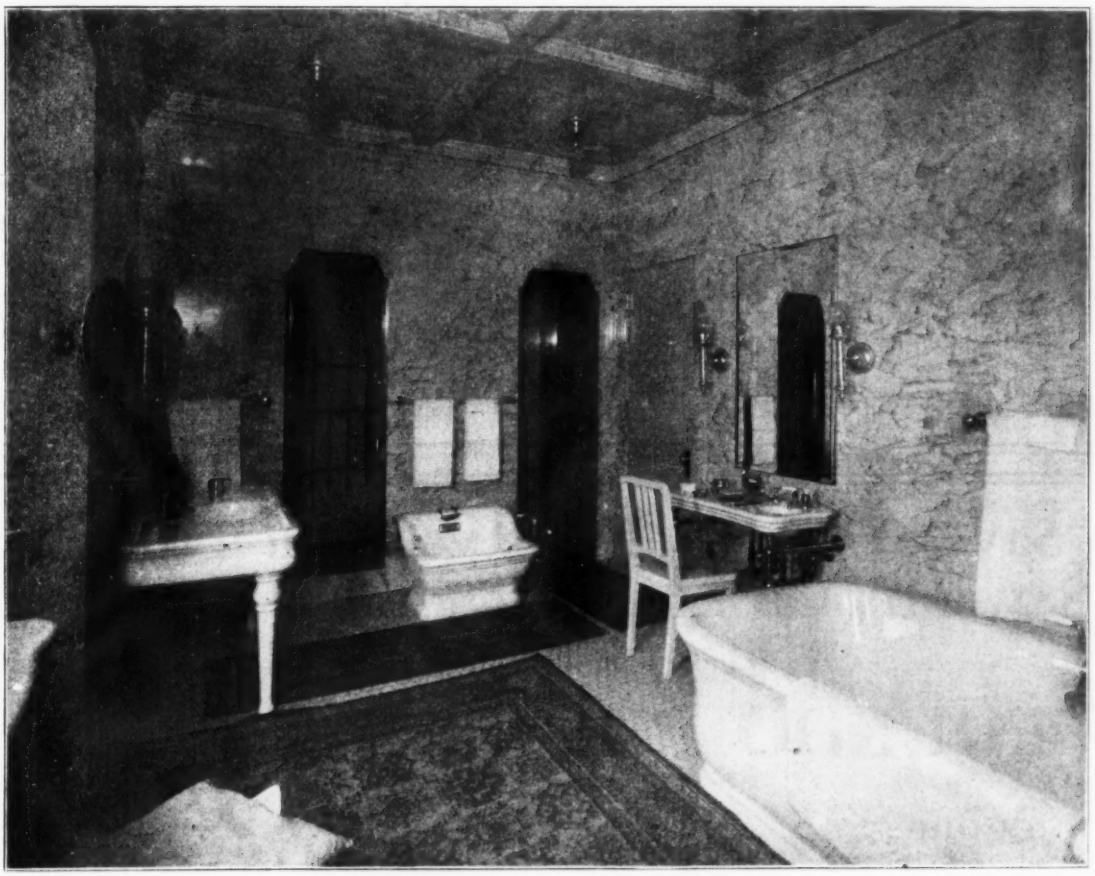
PITTSBURGH VALVE & FITTINGS CO., BARBERTON, O. We manufacture all kinds of valves and fittings. Write for catalogue

Kindly quote "Domestic Engineering" in writing advertisers.

Light=Air=Space

Three Essentials to Life and Health

Take another look at this picture of a bathroom. It appeared in a special article in the last issue but we want to be sure that every one shall derive the fullest advantage of it.



This bath-room embodies the three essentials to life and health—light, air and space. Of course, it is impossible and inadvisable to build all bath-rooms this size but the architects and public must be trained to give more space and attention to sanitary bath-room construction. Many bath-rooms today are dark, absolutely without ventilation and therefore full of foul odors. Show this picture to your customers as a matter of interest. The tide of sanitation is rising. Every installation of this kind is a fresh water-mark. Owners of good bath-room or other sanitary photographs will contribute to the advance of the industry by having them reproduced in "Domestic Engineering."

Be sure you are getting a Genuine Stillson Wrench when you pay good money for it. Look for the

If your dealer does not keep the Genuine Wrench write

THE WALWORTH MFG. CO.

128-136 Federal St., Boston **Park Row Bldg., New York**

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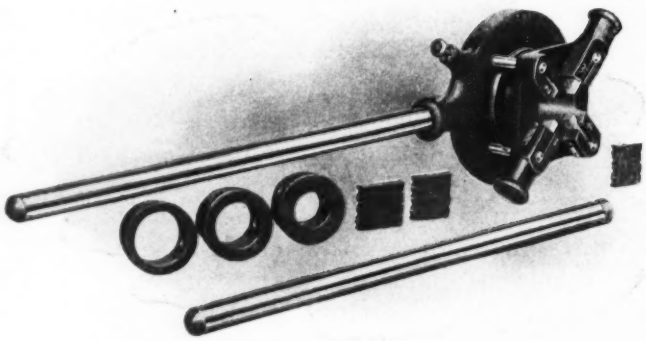
"Saves You Money, Saves You Trouble, Saves Its Cost Just Ten Times Double"

The above is what one of our friends of poetic frame of mind wrote us regarding

"TOLEDO" PIPE THREADERS

Buy one yourself and see

The thing that makes "Toledo" Pipe Threaders supreme is their simplicity.



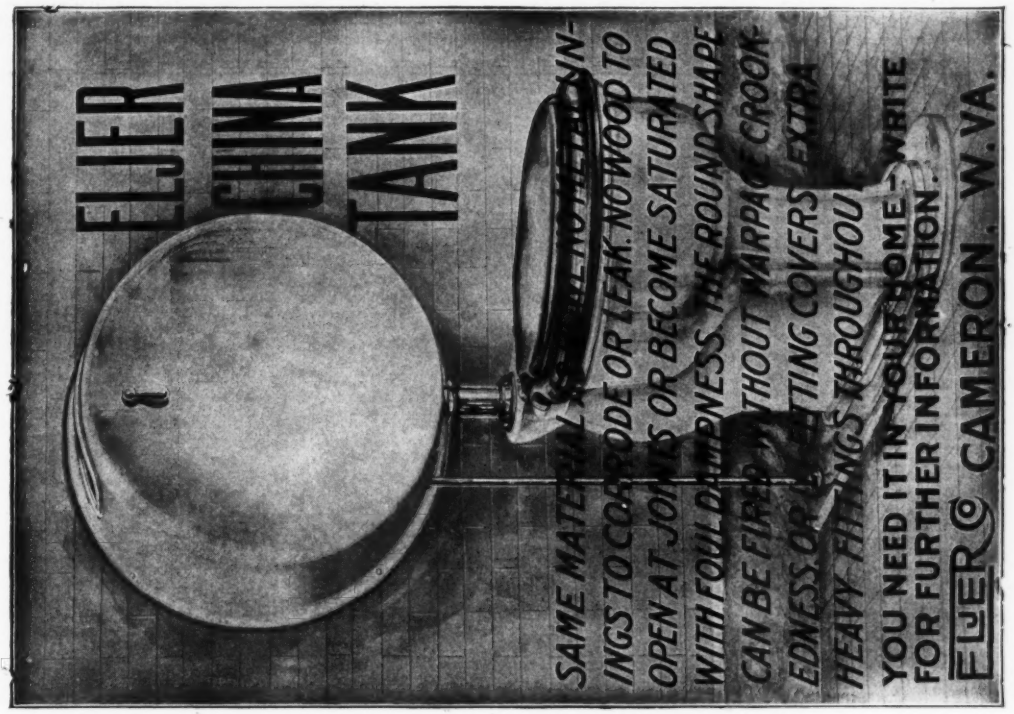
"TOLEDO" No. 1A—Capacity 1" to 2" inclusive. List Price $30.00.

They cut a perfect thread with less labor than any other tool on earth.

They do this with a mechanism that is practically as simple as the old solid die stock.

This simplicity, ease of operation, "day in and day out" quality of "Toledo" tools is what makes them supreme.

Catalog for the asking **The Toledo Pipe Threading Machine Co., Toledo, Ohio**



HOT WATER for DOMESTIC USE

A complete guide to the methods of supplying and heating water for domestic purposes, giving each step to be taken and explaining why it is done.

This is a book that every plumber and every steam-fitter will want to have in his trade-library, because it contains hundreds of valuable hints and short cuts that will lighten his labor, make his hot-water heating installations satisfactory and save time and money. The book consists of 124 pages, is copiously illustrated, and bound in a neat cloth cover. It will be sent postpaid on receipt of its price, which is only 50c.

DOMESTIC ENGINEERING
323-325 Dearborn St., CHICAGO

ADJUSTABLE RADIATOR FOOT REST

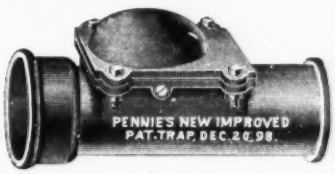
Patented Dec. 8, 1908

The time saved on each job pays for them —can be used for bath tubs and other fixtures.

The Jennison Company **Fitchburg, Mass.**

SOLD BY JOBBERS

"PENNIE" PATENT BACK-WATER SEWER-GAS VALVE



Will fit either standard or extra heavy pipe

Of the different makes of Back-Water and Sewer-Gas Valves the "Pennie" is not the cheapest but it is the best and most economical. Among other advantages it is adjustable to any position or direction of pipe, horizontal, vertical, or inclined.

Manufactured by

The Kennedy Valve Mfg. Co.

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The Star (*) indicates that the advertisement is inserted every other week, the dagger(†) once a month.

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Nine Recent Decisions in Vacuum Cleaning

1 May 31, 1910: U. S. Circuit Judge Kohlsaat, sitting in Chicago, granted a decree against Streeter Brothers, forbidding them from *using* a Vacuum Wall Brush which infringes the McCrum-Howell Patent. This suit was brought under one of the eighty-five vacuum patents which the McCrum-Howell Company controls.

2 July 7, 1910: U. S. Circuit Judge Kohlsaat, sitting in Chicago, granted a restraining order against the Pope Automatic Merchandising Co., and Clarence R. Pope, forbidding the manufacture and sale of the "Pope Electric Cleaner."

3 July 15, 1910: U. S. District Judge Carpenter, sitting in Chicago, after a full day's hearing, denied the motion of the Pope Automatic Merchandising Co., and Clarence R. Pope, to vacate Judge Kohlsaat's restraining order.

4 July 20, 1910: U. S. Circuit Judge Kohlsaat, sitting in Chicago, after a full hearing, granted the injunction asked against the Pope Automatic Merchandising Co., and Clarence R. Pope, manufacturers of the "Pope Electric Cleaner."

5 July 22, 1910: U. S. District Judge Morris, sitting in Duluth, granted a restraining order against the St. Paul Electric Co., and B. B. Downs, forbidding the manufacture and sale of the "Downs Electric Cleaner."

6 July 26, 1910: U. S. District Judge Amidon, sitting in Minneapolis, after a full hearing, granted the injunction asked against the St. Paul Electric Co., and B. B. Downs, manufacturers of the "Downs Electric Cleaner."

7 August 3, 1910: U. S. District Judge Denison, sitting in Grand Rapids, granted a restraining order against the Menominee Electric Co., forbidding the manufacture of Suction Cleaners in imitation of the **"Richmond"** Suction Cleaner.

8 August 16, 1910: U. S. District Judge Sanborn, sitting in Chicago, granted a decree against Streeter Brothers, users of a plant installed by a California company, enjoining the use of that plant because it infringes the Matchette Patent on Automatic Vacuum Control, now owned by the McCrum-Howell Company.

9 August 18, 1910: U. S. Circuit Judge Kohlsaat, sitting in Chicago, granted the Pope Automatic Merchandising Co., and Clarence R. Pope, permission to dispose of 1,000 cleaners on hand *only on condition that a $20,000 bond be given to protect The McCrum-Howell Co., and that each machine be plainly marked, "Not the Richmond Suction Cleaner manufactured by the McCrum-Howell Co."*

The McCrum-Howell Co., at a large expenditure, has brought together under one control, all of the important Vacuum Cleaning patents.

Thus enabling the public, *for the first time,* to obtain in a single *system, all* of the ingenuities of many inventors.

The convenient coupon will bring full information regarding the McCrum-Howell Vacuum Cleaning Systems.

The McCrum-Howell Co.

GENERAL OFFICES: Park Ave. and 41st St., New York City
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MANUFACTURERS OF
'RICHMOND' Heating Systems—'RICHMOND' Bath Tubs, Lavatories and Sanitary Plumbing Devices—'RICHMOND' Concealed Transom Lifts—'RICHMOND' Suds Makers—'RICHMOND' Suction Cleaners—'RICHMOND' Vacuum Cleaning Systems
FIVE PLANTS { One at Norwich, Conn—Two at Uniontown, Pa.—One at Racine, Wis.—One at Chicago, Ill.

WARNING

All persons are warned that henceforth all authorized stationary vacuum cleaning plants will bear The McCrum-Howell Company license plate. Systems offered without The McCrum-Howell Company license are infringements and will subject not only the makers thereof but also the purchasers and those who use them to damage suits, which in all cases will be promptly instituted. Please be sure to look for The McCrum Howell Company license plate, which is to be found in each case on the vacuum producing apparatus.

D. E. 9-24

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HONEYWELL

When you hear that name what do you

And when you think of hot-water he cause Honeywell is the man who re

Five years ago it was thought necessary to connect water radi than one inch was permissible.

Today the brightest and most successful fitters are connecting inch being exceptional.

What's the answer? **HONEYWELL SYSTEM.**

In four years from date of introduction thirty-five thousand other countries, and before the fires are lighted for another heating and efficient systems will gladden the hearts of home-owners in eve

The saving in cost, the higher efficiency, the broader range of tions that make the Honeywell system superior to all others for

Honeywell equipment is sold by all dealers in the United

Write for booklets.

Honeywell Heating

WABASH,

HONEYWELL

think of ? Hot-Water Heating, of course.

ating you think of Honeywell, be-volutionized water heating Practice.

ators with piping ranging from one to two inches—nothing smaller

radiators with piping ranging from one-half to one inch—over one

(35,000) Honeywell Systems were installed throughout this and season, fifty thousand (50,000) of these extremely simple, sightly ry country where hot-water heating is used.

temperatures and the smaller and more sightly piping are qualifica-home-heating.

States, Canada and European countries.

Specialty Company

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We want to furnish a fre "Special" Trip Lever to ev and every jobber who

READ THIS! TH

The Monarch Special Trip Lever is a brand new device which we have just placed on the market for operating all styles of closet flush valves. It is the simplest fixture of its kind on the market today and has at the same time certain features of adjustment not to be found in any other lever.

There are two adjustments in particular which should be greatly appreciated, one for the varying thickness of the walls of tank and the other for the length of rod to which the wire of flush ball is attached and both of these adjustments are made from *one point and with one set screw*.

The entire device is made of cast brass heavily nickeled with a substantial cast escutcheon for the outside face of tank. The handle furnished is made of porcelain and is liberal in size being 2 ins. long. The free sample which we are more than anxious to send you will far better convince you of the merits of this fixture than all the words we could jam into this add.

The price will surprise you. We expect to turn these levers out in enormous quantities and have whittled down the profit per piece almost to the vanishing point. Just fill out the coupon opposite and mail it to us right now before you forget it. We want **YOU** to have a sample.

Exclusive M

THE MONARCH BRASS C

e sample of the Monarch ery tank manufacturer assembles his own tanks

EN

FILL THIS OUT

WILL YOU SPEND

Two cents for a postage stamp and thirty seconds of your time for this free sample?

The Monarch Brass Co.,
Cleveland, Ohio

City.....

Genlemen:-

Date.....

Kindly send us free of all cost, sample of the Monarch Special Trip Lever and quote us price of same in lots of..... Our TANKS are made of ..... the thickness of same being.....inches.

Name.....

Address.....

anufacturers

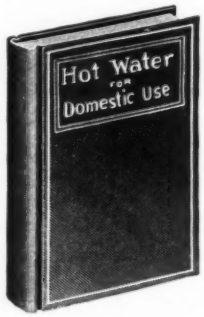
OMPANY, Cleveland, Ohio

Kindly quote "Domestic Engineering" in writing advertisers.

You can keep out of Hot Water and be sure of Hot Water for 50 cents by purchasing "Hot Water for Domestic Use"

Just Published

A Complete Guide to the Methods of Supplying and Heating Water for Domestic Purposes



Each Step to be Taken is Clearly Shown and the Reason for its Taking

This is a book that every plumber and every steam-fitter will want to have in his trade library because it contains hundreds of valuable hints and short cuts that will lighten his labor, make his hot water heating installations satisfactory and save time and money. It contains the very essence of expert knowledge, the boiled-down results of practical experience, which no one can get except by combining scientific study with actual practice. It is the most up-to-date work on the subject, and its value is increased by the fact that it has a complete index which makes it both invaluable and convenient for reference use. The book consists of 124 pages, is copiously illustrated, and bound in a neat cloth cover. It will be sent postpaid on receipt of its price, which is only 50c.

Address Book Department

Domestic Engineering

323-325 Dearborn St., Chicago, Illinois

Kindly quote "Domestic Engineering" in writing advertisers.

DON'T HESITATE

To Install Vacuum Heating Systems

Every Steamfitter should note the following:

The Bishop & Babcock Company guarantees to protect users of the Reliable Automatic Hydraulic Vacuum Pump against loss by infringement suits, where used in connection with any of the ordinary Air Line Vacuum Systems, like the Paul System, where Automatic Air Valves are used.

You Don't Have to Pay a Dollar for Royalties

The Reliable Vacuum Pump exhausts the air from the entire system and produces:

Immediate heating of every radiator.

Large saving in fuel.

Just the amount of heat you want, no more, no less, and just when you want it.

Let us tell you how easily any existing pressure or hot water system can be made into a practical and efficient Vacuum System.

The Bishop & Babcock Co.

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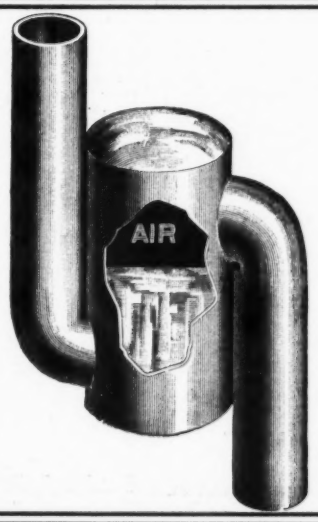

"A BLAST" A BRIGHT BUSINESS MAN ONCE SAID:

"It's none of my business what you do at night.
But if dissipation affects what you do The next day,
And you do half as much as I demand,
You will last half as long as you hope.
Furthermore, don't kick,
If I kick.
If you are worth correcting
You are worth while keeping.
I don't waste time cutting specks
Out of rotten apples."

True words, simmered down
To "what is worth doing
Is worth doing well."
Therefore, **Clean Sweep Traps**
The new pattern, with Swivel Inlet,
Will help you, where mistakes at roughing in
Are made, or where you need extra space
From basin to wall.
The offset is easily controlled
By any wrench that reaches.

Detroit Sanitary Supply Company
Sole Manufacturers
Second Avenue and Antoinette St. :: Detroit, Michigan

POINTERS

DALE BALL COCKS **Indestructible** are now furnished with Porcelain Seat.

The smooth, glass-like surface will not cut away with sand, cannot corrode and stick, saves wear on the washers and prevents whistling.

ALL parts of every "Dale" are tested and unconditionally guaranteed.

LUG on cap positively prevents flooding room, even if by carelessness or through error the regulating screw is broken or removed.

EACH Cock furnished with any required size of interchangeable bushings or with a solid shank threaded any required thread.

SOLE MANUFACTURERS

WOLVERINE BRASS WORKS

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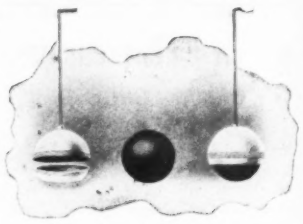
GACO

Jacketed Flush Valve Ball

A Round Rubber Ball in a Metal Jacket

Not like those ordinarily used. It cannot lose its shape or flexibility, it will not collapse and leak. If it becomes worn at point of contact with the seat, simply turn the ball and a new seat area is provided. Will last many times as long as the ordinary kind. Investigate and you will use them exclusively.



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For sale by Leading Jobbers | Used by Progressive Plumbers

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Manufacturers — **Pittsburgh, Pa.**

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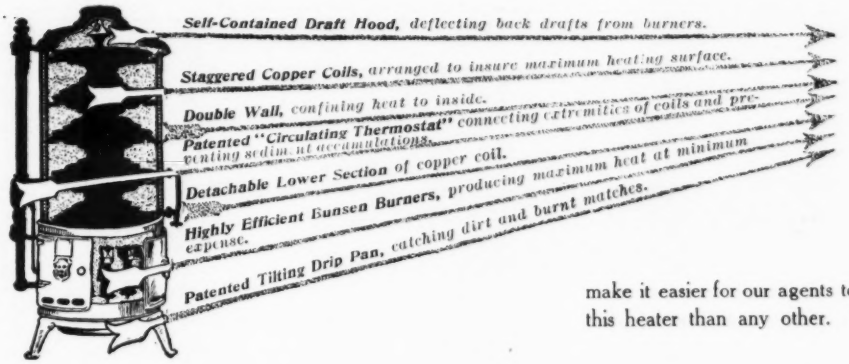

Self-Contained Draft Hood, deflecting back drafts from burners.
Staggered Copper Coils, arranged to insure maximum heating surface.
Double Wall, confining heat to inside.
Patented "Circulating Thermostat" connecting extremities of coils and preventing sediment accumulations.
Detachable Lower Section of copper coil.
Highly Efficient Bunsen Burners, producing maximum heat at minimum expense.
Patented Tilting Drip Pan, catching dirt and burnt matches.

Seven Vital Selling Points

make it easier for our agents to sell this heater than any other. The

"PITTSBURG" Automatic Gas Water Heater

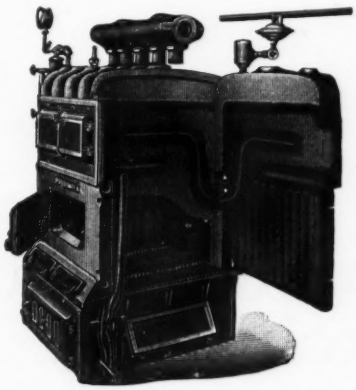
is but one of six heaters we manufacture to suit every requirement and pocket book. Each has more selling points than any other of its class.

We advertise these heaters for our agents in their respective localities. We will do it for you. Write today for our cooperative agency plan.

The Pittsburg Water Heater Company
Pittsburg, Pa.

Prudential Boilers

Hold Steam—require the minimum of fuel and attention



The Reason—

is that they have 75 per cent of direct fire surface. Sections are placed side by side making it much easier firing and removing ashes---every part being easy to get at. Send for catalog.

PRUDENTIAL HEATING CO., AKRON, OHIO

"Diamond N" ASBESTOS and Wool CEMENT

For Covering Corners Projections and Irregular Surfaces

Our cements are absolutely fireproof, good non-conductors, neat in appearance and can always be depended upon.

Steamfitters prefer them because they carry good "body," yet are light and are easy to work with in awkward positions.

We are always glad to make suggestions when needed.

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Norristown Magnesia and Asbestos Co.
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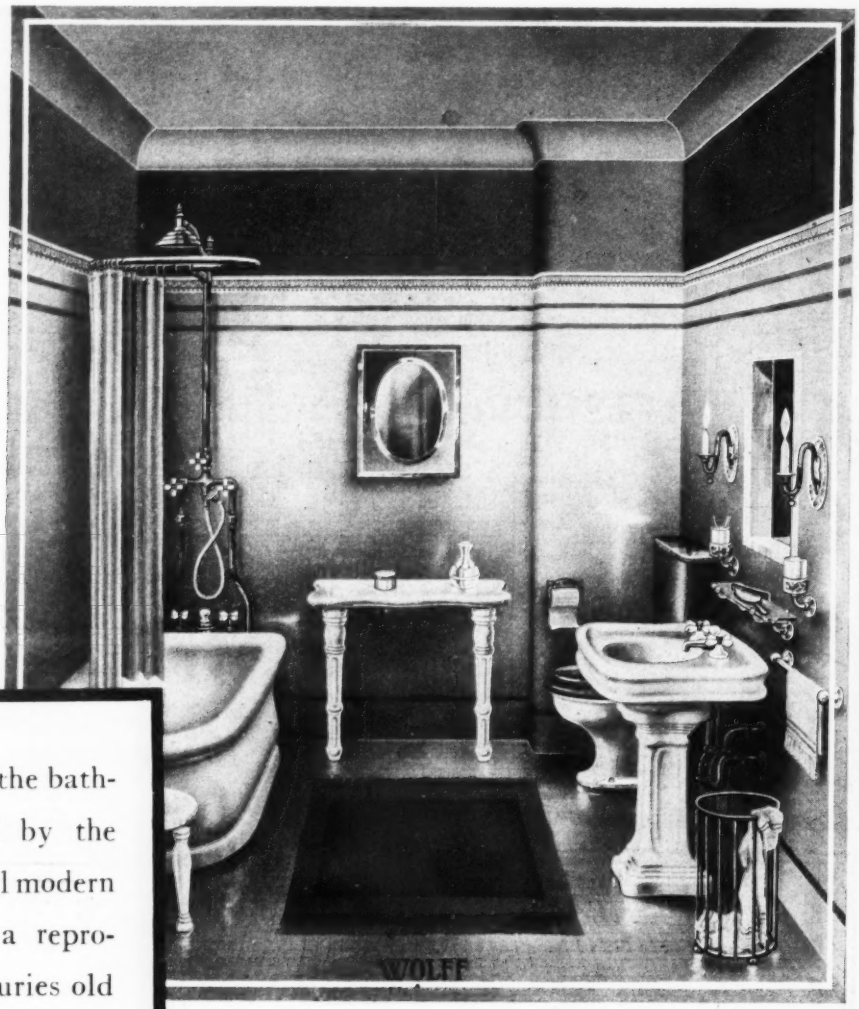
SELLING AGENTS EVERYWHERE



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That MUST be modern, and, to be thoroughly satisfactory, the best of its kind.

Wolff equipment insures this. No question of the owner's satisfaction if Wolff fixtures are installed.

L. Wolff Manufacturing Co.

ESTABLISHED 1855

MANUFACTURERS OF

Plumbing Goods Exclusively

THE ONLY COMPLETE LINE MADE BY ANY ONE FIRM

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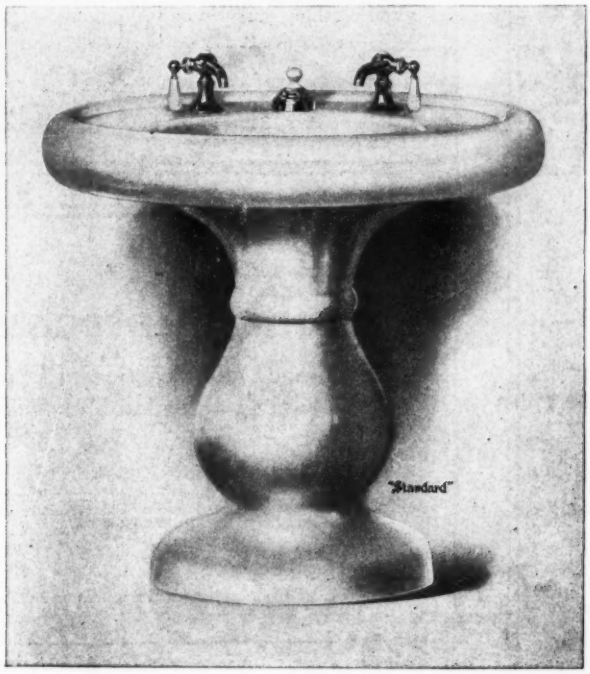
Lavatories

have always been noted for *Quality*. This reputation has been obtained and sustained by careful attention to several essential points.

The *Designs* have always been prepared with a view to convenience, comfort, and sanitary efficiency. The *Material* used is the finest procurable and specially selected for its particular purpose. The *Finish* is beautiful and lasting, **"Standard"** Porcelain Enamel being famous for its china-like gloss, hardness and unity with the iron of which the fixtures are made.



Avoy—Plate P 516

Add to these particulars the fact that highly skilled labor only is employed in their production, the liberal guarantees we issue with them, and the reasons for the superiority of **"Standard"** Lavatories are complete.

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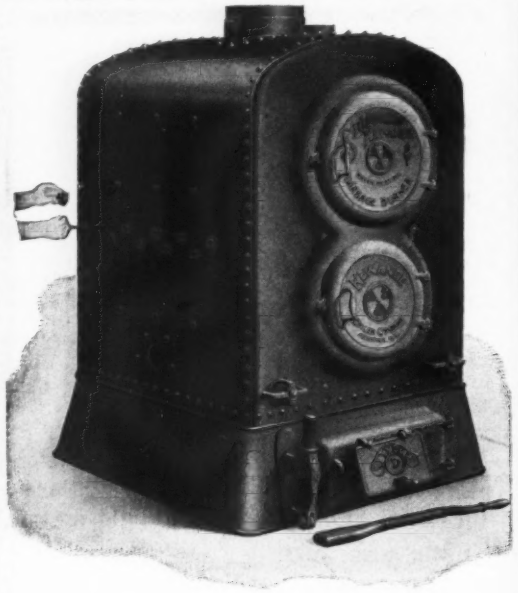

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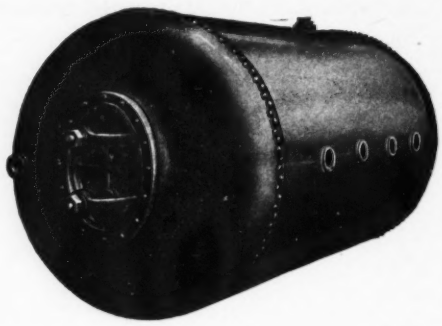

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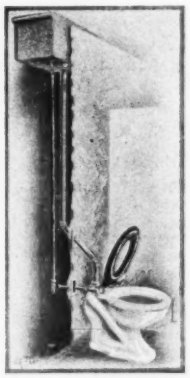

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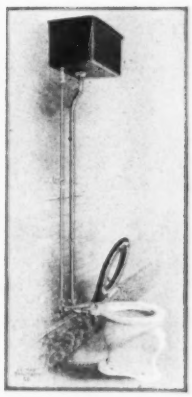

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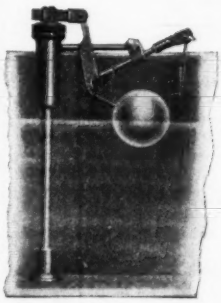

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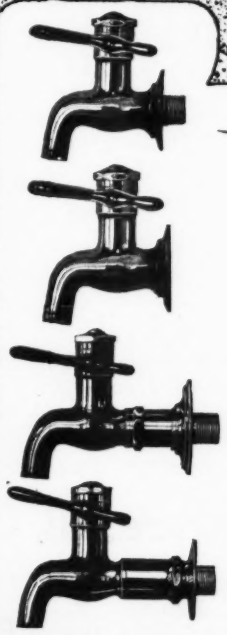

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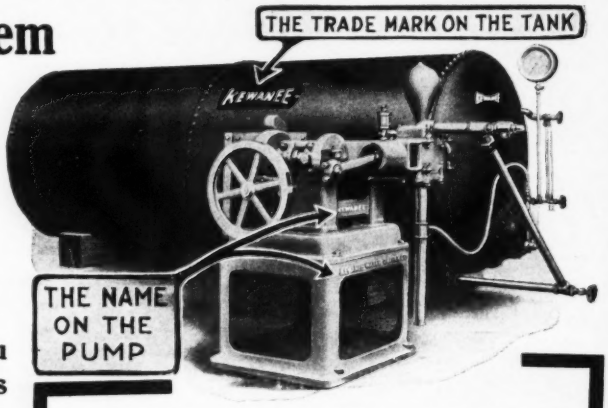

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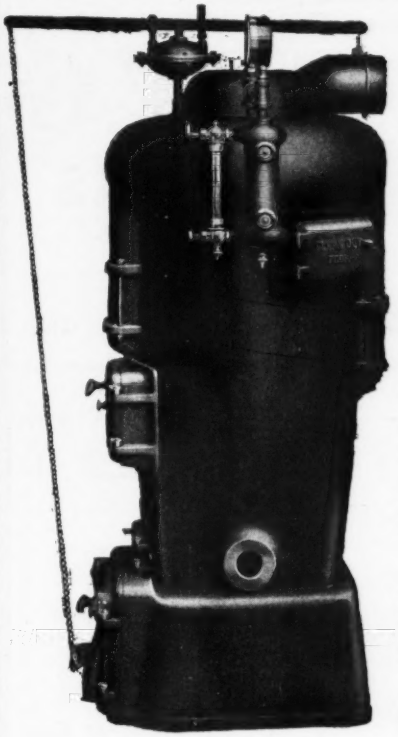

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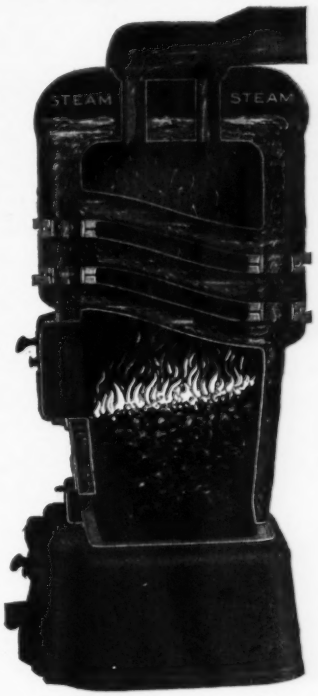

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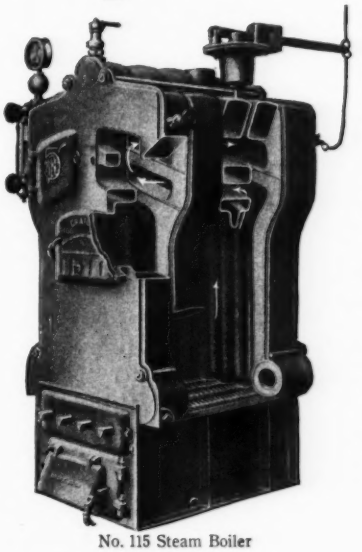

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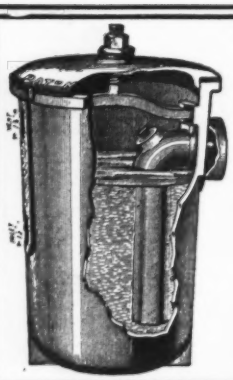

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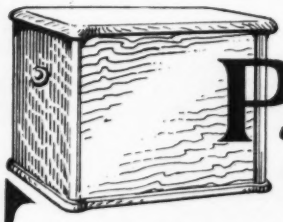

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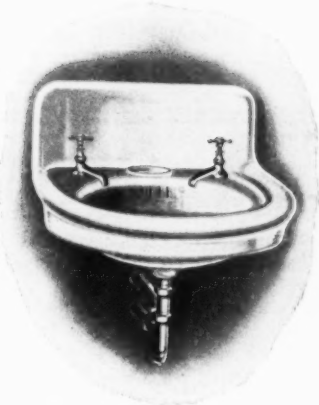

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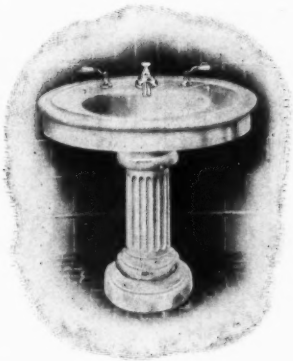

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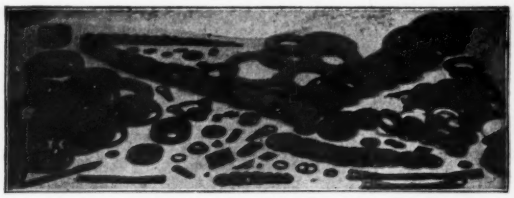

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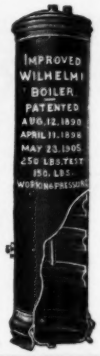

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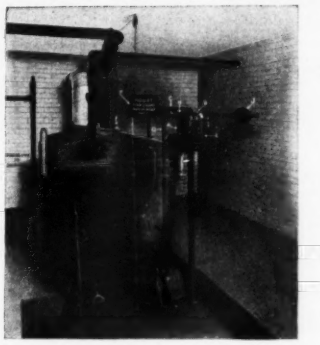

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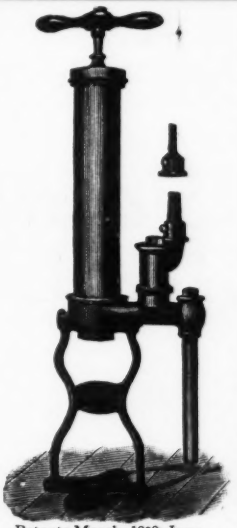

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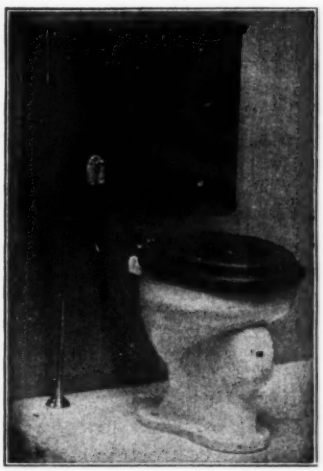

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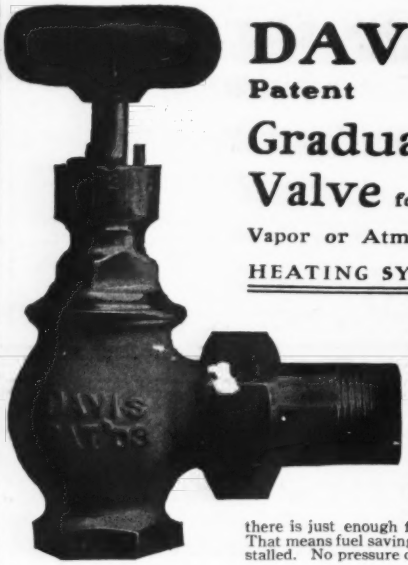

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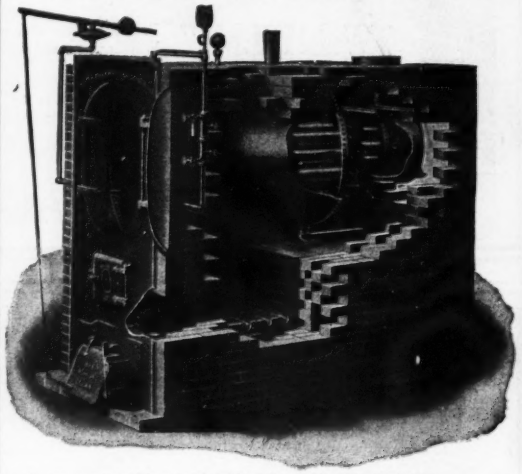

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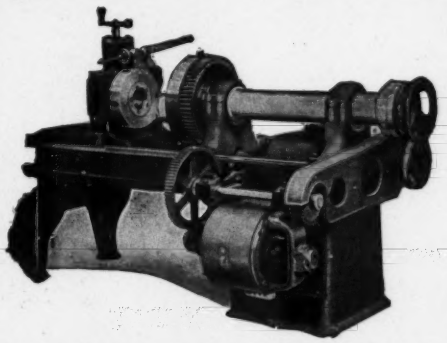

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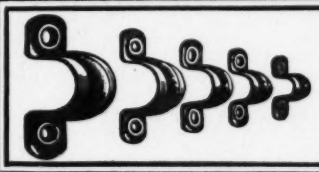

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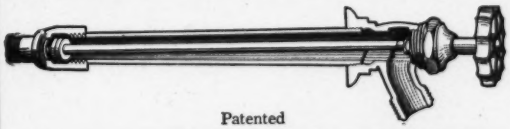

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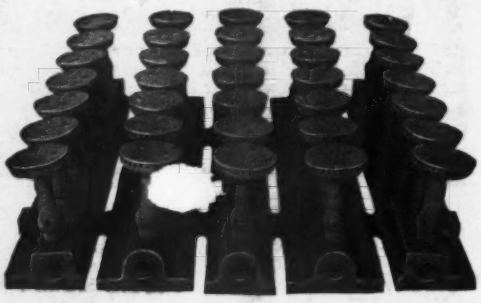

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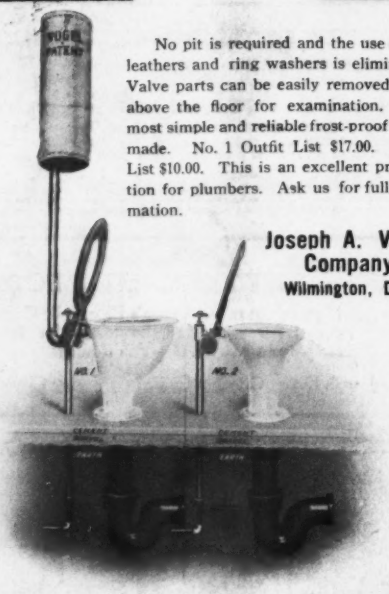

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